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AN ELIZABETHAN ARMY.

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THE wood-cut, reproduced as a frontispiece to this JOURNAL, is one of the best illustrations in existence of an English army on the march in the time of Queen Elizabeth. Some information in regard to an army of that period may perhaps interest members of the Institution. The original sketch appears in a rare work, "The Image of Ireland," which was written in 1578, and published in 1581 by one John Derrick, a follower of Sir Henry Sidney in his campaigns in Ireland.

Sir Henry Sidney, K.G., to whom the book is dedicated, was father of Sir Philip Sidney (author of the celebrated romance, "Arcadia"), and three times held the office of Lord-Deputy in Ireland: he was by far the ablest of the many able men who governed that country under Elizabeth. In those days a Lord-Deputy lived more like the general of an invading army in a hostile country than the Civil Governor of a peaceful and allied province; Sidney was continuously employed in either preventing or actively suppressing rebellion.

The long reign of Queen Elizabeth may, in one sense, be termed a peaceful one, but there was, nevertheless, a constant demand for troops either against the Scots, to put down repeated rebellion in Ireland, to assist the Huguenots or the "Hollanders," or to defend the kingdom against the threatened invasion of the Spaniards. At the commencement of the reign, such military forces as the country possessed were in any but a condition of efficiency, while the discipline was of the worst. There was no permanent armed force in the kingdom, and even the Trained Bands or Militia were no longer instructed in the use of arms, because the gentlemen no longer set the example. Troops were raised anyhow for an emergency, and when the danger seemed past the Queen, with her ruling passion—parsimony—promptly disbanded them. There is no doubt that England was behind all Europe in military efficiency, and this at a time when she was menaced by foreign enemies on all sides, and in perpetual peril of internal disorder. When apprehension of a Spanish invasion was constant, during the latter part of her reign, Elizabeth became more or

less attentive to her internal forces, but, on the whole, it may be truly said that no monarch before or since has ever treated her army with more constant neglect than Queen Bess. Her great effort was in 1588, when the whole force in the kingdom for resisting the Spanish invasion amounted to about 135,000 men, formed into three armies: one at Tilbury, under the Earl of Leycester; another to resist the landing of the enemy and act as occasion required; and a third, under Lord Hunsdon, for the defence of Her Majesty's person. The Justices of the Peace of each county had been ordered, in conjunction with special commissioners, to muster the whole male population over sixteen years of age at the expense of the shire; and to register the residence and occupation of each, and the kind of service suited to them, whether carpenters, smiths, and so forth. The men were to be sorted in bands, so that there might be in each band at least one hundred footmen, forty arquebusiers, and twenty archers. Great care was ordered to be taken in the selection of the officers. In addition to the company organisation, the force of each county appears to have been divided into regiments, or bands of 500, commanded by a "general captain," a term equivalent to colonel, who also mustered the horsemen, 700 of whom attended each regiment. The arrangements then made were of great interest and importance; they were studied and repeated by our Ministers, who in the old French war had to provide against the threatened invasion of Napoleon. Had the enemy landed, it is doubtful what sort of a front our troops would have displayed against the veterans of Spain. Their spirit was, no doubt, good, but dishonesty was rife, and the muster-masters were corrupt. We know from Sir John Smythe, an old soldier of some repute, that the clothing and equipment was bad, and that the arms were in bad condition and out of date. The situation was, doubtless, rendered more difficult by the fact that the business of war was passing through transition, and the long bow and the bill, with their accompanying tactics, were becoming things of the past. Military training no longer consisted in friendly matches at the archery butts. The old familiar instructors were cast aside for leaders from foreign schools, men who swaggered about in plumed hats and velvet doublets, and extravagant hose, swearing strange oaths of mingled blasphemy taught by Spanish Catholics and Lutheran landsknechts. Shakespeare was no mean observer of military matters; and, though it may provoke a smile, in his pages the student must look for the best history of the Elizabethan soldier.

The army depicted in the illustration is one of those hastily brought together to quell one of the numerous rebellions in Ireland. The men were raised by the ordinary process of the times—the press-gangs, which were not over-scrupulous in their methods. On one occasion they took advantage of Easter Sunday to close all the church doors in London and take a thousand men from the various congregations. At other times the prison doors were opened and the gaols cleared, the sweepings of the nation being driven into the ranks.

The force, it will be observed, is preceded by an advance guard of five mounted men armed with lances or spears. In addition to the lance, which was from sixteen to eighteen feet in length, each trooper carried a sword, and a shield bearing the cross of St. George. The shield was slung on the back on the march, but in action was carried in front of the breast for protection. The trooper's uniform comprised a helmet or pot, tunic or cassock of broad-cloth and top boots. With the first introduction of fire-arms, the men-at-arms, or heavy cavalry,

assumed most massive armour to ward off the effects of the arquebuse and pistol balls, but gradually the pieces were discarded one by one as useless encumbrances. The cavalry in the illustration wear armour on the body, arms, and above the knees, but it will be seen that the horses, no longer in danger of wounds from arrows, were freed from their armour.

The infantry are headed by a party of arquebusiers, their arms consisting of arquebuse, sword, and dagger. They also carried powder-flask, touch-box, and bullet-bag. England was a long way behind foreign countries in the introduction of the arquebuse, and it was not until the year 1567, when the movements of Philip the Second gave the alarm of invasion, that we raised a corps of 4,000 arquebusiers.

Next to the arquebusiers march the pikemen, in their centre being the flags, afterwards called the colours, guarded by halberdiers. The pikeman wore helmet, and armour for the body and arms, and carried sword and dagger, in addition to a pike made of ash and measuring some fifteen feet in length without the iron or steel head. Halberdiers were soldiers told off to escort general officers, or guard the colours. They carried halberts with battle-axe heads, but in other respects differed very little from pikemen. Following the pikemen come more arquebusiers carrying calivers or light arquebuses, and sword, dagger, powder-flask and bullet-bag. The caliver was a lighter kind of matchlock, between a musket and an arquebuse. Arquebuses, like pikes, were sloped on the shoulder, but there does not appear to have been at that time any very serious attempt at a manual exercise; the men stepped off with the right foot.

The Lord-Deputy Sidney rides on the left flank of the army, preceded by trumpeters, and standard, or guidon, bearers, and escorted by lancers, whose equipment has already been described. The music in an Elizabethan army was supplied by drums and fifes.

In her reign the army seems to have been clothed in various colours, according to the service on which it was employed. In 1566 the archers sent to Ireland from Liverpool were dressed in blue cassocks or coats, with two small gards or laces of blue. The Staffordshire men were in red; all the others in blue. Troops sent to Ireland the next year from Yorkshire wore light blue, with two small laces, red caps, and buckskin jerkins. In 1569, arquebusiers raised at Salisbury also wore blue coats and red caps. In 1574 the soldiers wore blue coats, the artificers red; and in 1575 the Earl of Essex's troops for Ireland wore blue coats and motley coats. Artificers sent from Lancashire to Ireland in 1576 wore white coats with red and green laces. Next year the billmen and pikemen for Ireland had light blue coats and white stockings and venetians or breeches. The lacing was red or yellow. But these bright hues were evidently found too conspicuous for active service in Ireland, for some dark or sad colour, such as russet, was recommended in its stead—a curious anticipation of our modern khâki.

On parade each company stood ten deep; companies being usually one hundred strong were thus square, a point which was considered of great importance. Both ranks and files had three different distances:—1st, open order (six feet apart); 2nd, order (distance with elbows up); 3rd, close order, used by the pikemen only. The evolutions were facing, wheeling, countermarching, and doubling their ranks and files; increasing either the depth or breadth of the corps, or changing the situation of the ranks and files with respect to front and rear, and

right and left. The manœuvres of the times were forming wings, wedges, rhombs, squares, triangles, the sheers, the saw, and a variety of other whimsical figures. The pikes formed the centre, the musqueteers, who acted as skirmishers, the flanks of each corps. Such is the information given in the military treatises which were written after Elizabeth had introduced captains skilled in the manœuvres practised in the Low Countries, to drill her army. The highest military rank in an army appears to have been that of Captain-General, after whom came the Lieutenant-General, the Judge or High Marshal, afterwards Judge-Advocate, and the Generals of Horse and Foot. The duties of Muster-Master corresponded to those of an Adjutant.

PEOPLES OF THE PACIFIC.[1]

By A. R. COLQUHOUN, Esq., F.R.G.S., Gold Medallist R.G.S., Author of "The Mastery of the Pacific," and other works.

Thursday, 20th November, 1902.

Admiral Sir N. BOWDEN-SMITH, K.C.B., in the Chair.

MY subject to-day is so vast, and covers so gigantic an area of the world's surface, that it may seem at first sight rather presumptuous to attempt to compress it into the limits of a lecture. The vastness of the area may be realised when I tell you that the Pacific has sixty million square miles of water surface. To put it another way, it is about equal to twenty times the area of the United States (excluding Alaska), or one-fourth the earth's surface. The average distance across is about twice that between New York and Liverpool.

It has been my task, however, not only to visit almost every portion of the widespread Pacific littorals, and many of the islands which stud her bosom, but also to turn over and sift large masses of literature relating to every branch of Pacific lore, the result of which is to be found in my recent work "The Mastery of the Pacific." By selecting the most essential points and avoiding technicalities I hope to give you a bird's-eye view of this interesting region—destined to be the chief arena of the commercial rivalries and international struggles of this century—which may perhaps stimulate the desire to enquire further into the history, geography, and varied problems of the Pacific.

Until recent times this wonderful ocean was almost unknown. And, although exploration began in the sixteenth century, it was not until the first half of the nineteenth had expired that the Pacific could be considered as fully explored and charted. No romance, I may say here, in passing, could be as thrilling or picturesque as the story of Pacific exploration. The growth of British interests in the Pacific is equally recent, and a notable feature in the history of the last half century has been the acquisition, by one or other of the great Western Powers, of nearly all the islands scattered over the vast Pacific area. Some, like the Philippines and Dutch East Indies, had been appropriated a good deal earlier. One group alone, the Japanese islands, retains its independence because its people set to work to Europeanise themselves. But the fact remains that the whole Pacific, with its myriad islands, has been parcelled out among the Powers, chiefly between Great Britain, Holland, Germany, France, and, last but not least, the United States. The peoples of the Pacific, of whom I am going to speak this afternoon, are now, with few exceptions, living under European rule. Some of the most ancient races are dying out, others will doubtless lose their individuality in time. It is therefore of peculiar interest

[1] The lecture was illustrated by a large number of lantern slides reproducing original photographs.

to take a bird's-eye view of them, and to see, roughly and imperfectly of course, what manner of people they are at the present day. I can only group them together according to the geographical position of their countries, and I cannot attempt to give a full list of the tribes that occupy the mainland littorals on either side of the ocean, so that my description must be incomplete from an ethnological point of view; but for practical purposes we merely want to know the characteristics of the principal living races, and the place they are likely to take in history, now that they are brought in touch with the rest of the civilised world.

I will begin by showing you a map of the Pacific. It must be explained that I have had to squeeze the two sides together in order to get them in. On one hand we have the American littoral—notice how straight and bare of islands. On the other the Asiatic littoral, bordered by a complete ladder of islands—Saghalin, Kurile, Japan, Formosa, Philippines—and here, between Australia and Asia, the most remarkable group of islands on the globe, comprising New Guinea and Borneo, Sumatra and Java—the latter, perhaps, the most beautiful and fertile spot on the face of the globe—and Celebes, unique not only in shape but in its flora and fauna. Altogether, this part of the Pacific Ocean may well claim to be absolutely unsurpassed in interest and beauty. Then we have, still on the Asiatic side of the Pacific, a perfect swarm of small islands. These look small on any map because of the vast area of the ocean, but as a matter of fact some of them are of considerable size. Finally, there are Australia and New Zealand, of vast extent, great resources, and occupying an admirable position.

The eastern or American littoral was originally peopled by those interesting and obscure races known as Indians. At the present day the white man reigns supreme along this coast, and as he is the only person who will play any part in the future of this part of the world, we need not dwell any further on this region. On the Asiatic littoral the Mongolian race is paramount. It is varied, branching off into Koreans, Indo-Chinese, and so forth. At the extreme south-east of Asia is the Malay Peninsula, and here, or hereabouts, is the home of a third race, the Malayan, which has spread through all these islands even to Japan, where it has mingled with the Mongolian. Though the Malays are a distinct people with strongly-marked characteristics, it is probable that they originally sprang from Mongolian stock. Then we get a group of islands collectively termed Melanesia. The people are a black race, but differ in many respects from the ordinary negro. Further east are a group of islands known as Polynesia, whose natives are of entirely different origin from the Malays, Mongolians, or Melanesians. They are believed to be of the same stock as ourselves—Caucasian—and are fair, straight in feature, and finely formed.

These, then, may be termed the principal *living* races of the Pacific: the Mongolians, Malays, Melanesians, Polynesians. Of their off-shoots and variations we must speak presently, but I will first show you slides which illustrate the four races.

Let us take first the Polynesians, those strange and wonderful people who inhabit the eastern outer fringe of the Pacific Islands. The extraordinary isolation of this race must account for some of its peculiarities. The nearest island to the American coast is Easter Isle, and that is 2,000 miles away. Between the Polynesian Islands and Asia the distance is much greater, but it is bridged by groups of islands, and it is believed that the Polynesians originally came from that

continent, and gradually spread out further and further into the Pacific, until, reaching the fertile islands of Samoa, they took root and spread thence to other groups. This theory is supported by the fact that there are distinct traces all along the Asiatic littoral of a Caucasian people, who must have migrated there in very early times. It is believed that the Koreans show distinct traces of a Caucasian strain, while in northern Japan the race is represented by those curious people, the hairy Ainus. Other remnants of a white race are to be found in the highlands of southern China, in Cambodia, and in two islands off Sumatra, and it is likely that they may have been driven across the ocean by the succeeding waves of Mongol immigration.

Before the advent of these Caucasic people, however, two black races were, in all probability, already established. I say "in all probability," because there is a good deal of doubt as to the second; but the first race, the Negrito, must undoubtedly be considered as the true native of many Pacific islands. These Negritos are now only to be found in the Philippines and in parts of the Malay peninsula, but there is evidence that they once occupied a much larger area. They are like small, degenerate African negroes, and are a weak and dwindling race. They are nomadic in habit if left to themselves, and live by hunting, practising the rudest agriculture, if any, and having no manufactures. They will probably be extinct before very long, although the Americans are anxious to preserve them for scientific reasons, for they present an interesting study of one of the oldest and most primitive of the races of mankind. The other black race has its home in the islands called Melanesia, though in a pure form it is only found in New Guinea. Here the natives are known as Papuans, and are distinguished by their jetty blackness, height, lively disposition, hook noses and immense mops of frizzed hair. Whether these people were in possession of the islands before the Polynesian migration or not, I do not feel able to pronounce an opinion. They are a strange people, of very distinctive characteristics, but a more difficult ethnological puzzle than they present it would be hard to find. Undoubtedly they have mixed largely with Malays and Polynesians, but the study of a large number of characteristic types reveals features quite foreign to either of these races. I have seen amongst these jet-black men faces of a purely Semitic type—the characteristic nose, lips and chin, and the full eyes. Others have the high bridged nose, thin lips and piercing gaze of the Arab, and side by side one sees the flat-faced, broad-nosed, blubber-lipped negro, who might easily be taken for an African were not his hair, instead of being woolly, long and crinkled in the most extraordinary manner. The women, it must be mentioned, usually have the hair cut close, while the men wear it in a huge mop, as I have described, and love to adorn it with flowers and feathers. They are as a race extremely fond of adornment, and wear armlets of shells, into which (in default of a buttonhole) they stick bunches of leaves or flowers. They also practise tattooing, and are extremely clever in carving wood and bone. The Melanesian Mission has had a hard task amongst these people; and, although it has gained a firm foothold among the smaller islands, New Guinea, the home of the Papuan, still continues to be a very unsafe place for travellers. The horrible practice of cannibalism is said to be hardly yet extinct there, though the natives disclaim it. The Papuan woman is allowed a good deal of freedom and equality in their councils, but she is also expected to work for her lord and master, who has no particular liking for labour.

This race, varied by intermarriage, chiefly with Polynesians, occupies some of the islands in which Great Britain is most interested, namely, the Fiji Isles and New Hebrides.

Among the strange customs that used to prevail in Fiji was that of burying alive any old person or sick man not expected to recover. A missionary relates that a young man, afflicted with a wasting disease, asked to have his sufferings ended in this way, but, repenting when half way through the operation, began to call out for release. His relations thereupon told him not to give so much trouble! "Come, now," they said, "be buried decently, according to custom!"

It is believed by some enquirers that the Papuans and other Melanesians are not a distinct race, but are the result of foreign blood grafted on to a stock resembling the Negritos. One feature in the history of all Pacific people is that their islands saw the frequent wrecks of ships of many nationalities, and some of the sailors no doubt survived and mingled their blood with the natives.

The Polynesians spread out beyond these black-inhabited lands, and established themselves in the fairest islands of the mid-Pacific: such spots as Samoa, Tahiti, and eventually Hawaii. They settled down to a life of careless, graceful ease, which lasted for many centuries until the coming of the white man. Their antiquity and isolation are proved by the fact that they had either lost, or had never known, the art of pottery-making, doing their cooking in holes in the ground, or using gourds or shells as vessels. The early explorers found these people in a state of idyllic happiness. Disease was almost unknown, poverty was as scarce, while no one need be overworked, since a bountiful earth provided everyone with the necessities of life. The women did no hard work, and were extremely well treated; and the whole population took its recreation in gathering flowers (which were strung into wreaths), in dancing, swimming, or otherwise disporting like children at play. As there was no particular moral code, they had consciences void of offence; and the chief blot on this idyllic state was the internecine feuds which frequently raged, and the practice of cannibalism.

The advent of the white man has changed all this. Although the people are undoubtedly more enlightened, it is to be feared they are less happy. In the march of civilisation such things cannot be avoided, but in many respects the introduction of Western ways has been fatal to the South Sea Islander. Disease, brought by foreign ships, has carried off thousands of the people, who were more susceptible because, as they had never before suffered from epidemics, none of them were immune. In other respects they seem to suffer from contact with the West. They lose their liveliness, their spring, their childlike pleasure in living. They eat of the tree of knowledge of good and evil, and in many cases succumb to the temptations around them. All this despite the fact that they have proved most willing and zealous converts and apt pupils. In some islands nearly every child can read and write, and everyone possesses a Bible.

I cannot linger over the fate of these charming people, but must mention the one part which they seem likely to play in the political and economic drama of the future. The labour question is one of the most pressing of Pacific problems, and Australia particularly, with her sparse population, was formerly anxious to secure labourers for her northern territory of Queensland, which is unsuited for any but native labour. Large numbers of Polynesians and Melanesians, and of the people who are a cross between the two, have been imported therefore

into Australia, and it became apparent that under these circumstances the depopulation of the islands would proceed even more rapidly. Owing to the objection of the white labour party to the employment of coloured workmen, it has now been made law that these "Kanakas," as they are called, are to be kept out and only be employed under contract, and are to be sent back at the end of their time to their own villages—a course to which, by the way, the "Kanakas" themselves strongly object.

Before leaving the Polynesians altogether I must mention a mystery in connection with them. In my opinion, there is perhaps no mystery in the world so fascinating as this one, and none of our scientists so far have been able to make anything more than the merest guesses at its solution. I have said that the Polynesians have not the art of pottery, nor of carving—in fact, there is no trace of iron or stone implements to be found among them, and they use instead sharpened shells. And yet many of the islands in which they live contain vast ruins of stone houses, huge statues with strange features, curious paintings and what looks like writing on the walls, and many other remains which prove conclusively that a people of a more advanced civilisation once inhabited these islands. To this race—gone, forgotten, leaving behind no tradition, nothing save these big strange buildings and uncouth statues—we have absolutely no clue; and perhaps the strangest feature of all is that the most extensive of these prehistoric remains are found in that remote island—2,000 miles from the American mainland and 1,400 miles from the nearest island—known as Easter Isle.

Turning to New Zealand, we find again a Caucasic race, undoubtedly an offshoot of the Polynesian, known as the Maori. It is unlikely that these early settlers found any native population in New Zealand, for that island, generally believed to be the oldest on the face of the globe, was separated from its parent continent at a period so remote that indigenous mammalia are practically non-existent, and we find many birds of species peculiar to the islands, and even of genera unknown elsewhere.

The Maoris had in many ways developed a good deal more than their ocean brethren, probably because the conditions of life were more strenuous in New Zealand than in the Polynesian Islands. Not only was the climate more severe, but the absence of mammals and of such food-stuffs as the bread-fruit, banana, and cokernut, made it imperative that they should become skilful fishers, bird-hunters, and agriculturists. Their houses had to be well and strongly built, and were most tastefully and elaborately decorated, and they adorned themselves with intricate tattooed designs. They made mats and cloth, and clothed themselves in long mantles. They had temples, priests, and religious ceremonies, and were organised for offence and defence, dwelling under chiefs, and presenting a picture of one of the most complete savage civilisations yet known. They resisted the white man when he first came to their beautiful islands with all their power, but the wave of European civilisation could not be checked, and to-day the Maoris, many of them educated men, live peacefully under the British flag, and turn their attention to the arts of peace. Unfortunately, this sort of life agrees no better with them than with their kinsmen the Polynesians. They are a dwindling race, and count for nothing in the political economy of the Pacific, save from the scientific and historical point of view. The same may be said of the Australian aborigines, who still

wander about in the interior of that continent, and will probably survive longer than Maoris or Polynesians, because they occupy regions where the white man cannot live. These Australian natives are believed to be a very primitive species of the Caucasian race, and although scientists are now inclined to cast doubt on the theory which divides all mankind under three heads—Caucasic, Mongolian, and Ethiopian—it must be allowed that these people, savage and degraded as they are, have closer affinities with ourselves than with the yellow and black races who are their neighbours. They are a nomadic, hunting people, living in the rudest shelters, having no knowledge of pottery or of agriculture. Their neighbours, the Melanesians, use the bow and arrow, but they have no knowledge of it, using a peculiar weapon known to us as the boomerang. In its simplest form, that of a flat heavy throwing-stick, this weapon was known to the early Egyptians; but the Australians construct it so that when thrown it changes its course in the air and returns almost to the hand of the thrower.

The Australian, when brought into contact with civilisation, seems to be fairly quick and tractable, but not capable of much mental development. In physique he is degenerate, small, slight, with flat calves. His hair is plentiful, on the limbs as well as the head. He scars himself, as a sort of rough tattooing—apparently his one attempt at decoration of any kind. The practice of making scars on the body is common also in Melanesia, and a surgeon who studied there tells me that in many cases it is done with the belief that it will relieve pain. A man with severe headaches will thus have his head scarred, and as the instrument used is a sharpened shell, the counter irritation set up probably proves effectual.

The worst side of the Australian bushman's character is the treatment of his women, and in this respect he is certainly lowest in the human scale. Not only has a woman no rights of any kind, but she is treated as a beast of burden, and if she fails to provide her master with what he wants he may maim or even kill her at will. Infanticide is naturally common, and cannibalism is also practised in its most revolting forms, though it has decreased in tribes which have been brought in contact with white men.

So far we have had to deal only with primitive and half savage people; the graceful, handsome, lazy Polynesian; the lively, vigorous, fierce Melanesian; the interesting but subdued Maoris; the wretched, degraded, primitive Australian bushmen. All these races were—some still are—cannibals, and, although varying greatly in the degree of their civilisation, none of them possesses a native alphabet, or has invented a written form of language. All are now under European domination, and many have adopted the clothing, language, and manners of their new masters. We must now turn to a race which, being more in touch with the Asiatic continent, attained a far higher degree of civilisation, and has, to a certain extent, an authentic history.

I showed you on the map the principal islands inhabited by Malays—these are the Philippines, Formosa, Borneo, and the Dutch East Indies. The last named are nearest to what is probably the cradle of the race—the Malay peninsula—and, indeed, it is a moot point whether the Malay race evolved itself in Sumatra and went to the peninsula, or *vice versâ*. No one who knows Indo-China, and has seen the way in which the Chinese-Mongolian type shades off into the Indo-Chinese, and so into the Malayan, can doubt that the Malay is

related to the Mongolian, but a most extraordinary contrast exists in character between the present-day Chinese and Malays. The typical Malay is short but well built; like the Chinese, he has finely-formed hands and feet. His eyes have a tendency to obliquity, though they are not the almond-shaped slits of the typical Chinaman. His nose is rather broad and inclined to be flat at the tip, his lips full, his features rather rugged and his hair invariably black and straight. In colour he is brown; a warm deep brown, not at all the bronze yellow of the Chinaman, and yet there is an unmistakable family likeness. I have never seen a Malay with such regular, handsome, intellectual features as one finds in the better class of Chinese, but the average of looks among poor people is certainly in favour of the Malays. Especially when very young, the women are often extremely pretty, and the boys are fine, sturdy little figures, with shocks of black hair and merry brown eyes. The Malay retains throughout Malaysia not only most of these physical but many mental characteristics. With a few allowances the following description will do for the native of the Philippines, Dutch East Indies, or Malay peninsula.

The Malay has a certain charm of character. He is a gentleman, and invariably polite; he is a sportsman, and is brave and reckless, though superstitious. On the contrary, he is neither honest, in one sense of the word, nor truthful. He holds life cheap, and thinks little of murder; he is bright up to a certain point, but lacking in intellectuality. He is always a provincial: more, he rarely takes any interest in affairs outside his own village; and this, added to his incapacity for organisation, has had the result that no Malay nation has ever emerged from the hordes of that race which have overspread some of the fairest islands of the Pacific. There have been powerful Malay kingdoms, as in Java, but these owed much of their civilisation to the Hindus who at one time ruled in that island. At the present day, however, none of these survive, and all fell into a condition of corruption and decay before the end came. A few Malay States remain independent in the peninsula, but all are more or less under tutelage, and unless they are firmly and tactfully dealt with they relapse into disorder—a state of affairs actually existing in those Malay States which are under the suzerainty of Siam. The great defect in Malay character is the lack of energy and perseverance—they are indolent to an extraordinary degree.

Although I have spoken of Borneo and the Philippines as inhabited by Malays, they are by no means the indigenous people of these islands. When they arrived they found a strong and warlike people already in possession. These people, apparently of the same stock in Borneo, Sumatra, the Philippines, and Formosa, are known by the generic name of Indonesian.

There is a great variety of tribal names, but some of the most celebrated are the Borneo Dyaks. It will be readily understood that after the Malays took possession of the island-coasts and drove these people inland, a certain amount of intermarriage took place, so that the type has been modified to a great extent, and indeed many of the Borneo Dyaks and mountain tribes of the Philippines are hardly to be distinguished from Malays, while many tribes, having intermarried with Chinese, have strong resemblance to them. It is, however, believed that these wild tribes are of the same origin as the Polynesians, being a semi-Caucasic race, and their stature, features, and in many places complexion, seem to bear out this theory. At the same time

it is probable that they overwhelmed and absorbed a black race akin to the Negritos—none are to be found in Borneo at the present day. As to appearance, they are frequently characterised by a fine physique and cast of features, and the more advanced tribes practise a rude agriculture and live in houses built high off the ground—even higher than the ordinary Malay house. They are skilful hunters and trappers, and some tribes excel in fishing. They vary too much to admit of any general description, but in all their habitats— in Sumatra, Borneo, Formosa, and the Philippines—they have one distinctive and revolting custom. They are all head-hunters; and even to-day, among tribes living under the British flag and nominally semi-civilised, this practice continues. It used to be a sign of prowess, of the conquest of an enemy; but it has become a mere revolting butchery, since old people and women are killed, to increase the number of ghastly trophies hung up to dry in the roof.

Missionaries have made very little way amongst these wild people, and though Roman Catholic priests have been labouring among the tribes in the Philippines for three centuries, comparatively few are really Christians. Their own religion—for they never adopted the Moslemism of their Malay neighbours—seems to be in the main Nature and spirit worship; but in one of the Philippine islands, it is interesting to note, there is a tribe of fire-worshippers, whose devotees have the image of a sun tattooed on the back of the hand. The position of women among all these tribes is no harder than the circumstances of their life make necessary; but, as with all people of Malaysia, the women take a principal share of the day's work. The Malay himself thinks it no shame to let his wife support him if she is able and willing, and she is usually responsible for the food of the family, while her lord spends any little surplus on a fine new "kris" (his favourite weapon, a curved knife), or a decorated box to hold his "siri" and betel nut.

The island which saw the fullest development of the Malay was *Java*, specially suited by its fertility and climate to be the foster-mother of such a pleasure-loving people. It is difficult to believe that there can be any spot on earth more beautiful, in a gracious, smiling way, than this favoured island, and though the coasts suffer from heat and are fever-stricken, the climate in the mountains is as near perfection as can be imagined.

This is probably the one tropical country where European children can grow up with rosy cheeks and healthy, sturdy limbs.

I have no time to deal with history, but most of us remember with regret that this lovely island was once the property of Great Britain. It was returned to the Dutch in 1811, in a much more peaceful condition than when we first took it from them. They had to contend with two great Javanese kingdoms, who for thirty years fought obstinately against their white opponents. These kingdoms were wealthy and powerful. The monarchs lived in walled cities, with stone-built palaces, baths, private menageries, and all the pomp and circumstance of Oriental royalty. The Javanese acknowledge a hereditary nobility, and were organised in a manner which recalls our feudal system. They had even a court language, distinct from that spoken by the common people. There are many written languages to be found among the Malaysian islands; and of these four came from Java.

Once conquered, the Javanese have proved docile. The Dutch pursue a method very different from our own in their colonies. They

govern and administrate, using native officials in all the lower posts only, and they compel the people to work. This is, to an Englishman's mind, an infringement of individual rights, but it has not been an unmixed evil in Java, although I fear it has worked less smoothly in more isolated islands. Java is in a state of cultivation quite inconceivable in this country. Even steep mountains are cultivated to their very summits, and the system of irrigation is so complete that the whole country is watered regularly. This country supports a dense population, increasing rapidly, and these people, although poor, are not by any means wretched. Pauperism is less common than in India. Crime is comparatively rare, and the narrow margin left by a living wage gives little opportunity for indulging in European vices. On the other hand, the people are making little or no progress. To keep them contented they must not be allowed too much education, so the Dutch discourage this and also mission work. One of the problems of the day is whether, with the increasing volume of European intercourse with the Pacific Islands, it will be possible to keep Java in a state of stagnation, and to preserve her people as children under tutelage. The Dutch have done their best to put a ring fence round the island, and discourage Chinese or any other immigration; but will not the wave of civilisation sweep over these barriers, bringing with it all its consequences of good and evil, light and darkness?

Meanwhile, I wish you could all see a Javanese village, as I have seen it, shaded by palms, each thatched hut neatly enclosed by a stake fence adorned with bright trailing flowers. The brown mother in her cotton *sarong* or skirt of home-woven material dyed in blue and brown, and her long-sleeved white jacket, lies on a mat chattering gaily to her brown babies, who play about her in various stages of nudity. Or else she trudges cheerfully to market, baby sitting on one thigh, while her bundle is strapped on her back and she holds a tattered umbrella over her dark head. Her "man," if his absolutely necessary bit of work is done for the day, squats on his heels among a group of other worthies and boasts of the superiority of the fighting cock he has just got. Everywhere there are smiles and cheerfulness; for a simpler, gayer-hearted people do not exist than the Javanese.

The striking feature, to a British eye, in all the Dutch East Indies, is the way in which, if he only works, the native is left alone. If he complies with certain rules, no attempt is made to coerce him along the path of progress. Very different is the condition of the natives in the Philippines, who are also members of the great Malayan family. It is related, as showing the close relationship between all parts of Malaysia, that when the Spaniards first landed in the Philippines they were able to converse through a man they had brought originally from Sumatra. This may be approximately true, but hardly literally, for the different branches of Malays speak innumerable dialects, and there are two quite distinct variations in the Philippines themselves. A sort of "low Malay," a language made up of words from many languages grafted on to the most common Malay, is spoken in all parts of the Far East, on ships and to servants. Most Europeans adopt this lingo, which is easy to pick up, and together with "pigeon-English" it will carry him along very well.

The Filipino branch of the Malay family has been modified by a great deal of modern blood. A large proportion of Filipinos, including most of the wealthy merchants, are Chinese half-breeds, or *mestizos* as the Spanish term them. Then there is a numerous class of Spanish

mestizos, and many show by their features that they have Japanese, and some even Indian and negro blood. Never was a more mixed race; but, through all, the Malay is the dominant note, except perhaps in families almost purely Spanish.

These beautiful and fertile islands, which are believed to number in all at least some 600, were discovered by Magellan in 1521, and conquered by Spain during the following century. This conquest was to a great extent made by the missionary priests of the Augustine and Jesuite Orders. They converted the people wholesale, with the exception of the wild and savage mountain tribes. As the wave of Christianity passed down the islands from the north it encountered Mohammedanism crawling up from Java, where it had supplanted Buddhism. A stern conflict has been waged ever since between the priests and the Moslems, but the religion of the Prophet, which is peculiarly agreeable to Malays, and fits in with many of their idiosyncrasies, had taken firm hold in the Southern Islands, and continues to this day to be the religion there. In these islands, therefore, the dress and customs of the people are quite different from those of other Filipinos; and it was only just before the Spanish-American war that these Mohammedan islands acknowledged Spain as their suzerain. These islands were for years the strongholds of the most daring pirates, who infested the archipelago and the neighbouring coasts of Borneo. It is only of recent date that this piracy has been put down, and many are the stories to be heard in these parts of hair-breadth escapes from these lawless men, who would descend upon a neighbouring island suddenly, kill all the middle-aged people and children, and carry the young ones off as slaves. I am glad to say that under the Americans these Moros, as the Spaniards name them, seem to be settling down comfortably, and though the Government at Washington has been sorely puzzled to know what to do with citizens whose religion allows them several wives, and permits slavery, yet they seem to be getting over the difficulties with great tact.

The rest of the Philippines are occupied, first, by the Indonesian mountain tribes, of whom I have told you, and who will not give the Americans much trouble, and, second, with the mixed people of Malay stock called Filipinos.

The Filipinos have been, nominally at all events, Christians for three centuries, and a certain number of them have been educated; but the mass of the people, under Spanish rule, received a most superficial smattering of knowledge, which they often learnt by rote without understanding. As a matter of fact, their civilisation is little more than skin-deep. The typical Filipino is very small, slight, and brown, with a lean hairless face, dark eyes and hair. His costume is quaint. A broad-brimmed hat, a white singlet and cotton trousers, over which he wears a shirt—cut in all respects like an English one, but made of fine muslin or embroidered lawn. This, as I said, hangs outside his trousers, and looks most extraordinary until one is used to it. As soon as Master Filipino gets on in the world, however, he wears his shirt inside his trousers, and adds a coat; and the height of magnificence is reached when he puts on black broadcloth, very shiny and patent leather shoes. The dress of the women is peculiar, and more difficult to describe; but the slide I will show you gives an idea of it.

The Filipino aristocracy consists for the most part of people who have a good deal of Spanish blood; and the men wear ordinary

European clothes, but most of the ladies prefer the native costume, which is not only comfortable but becoming.

There are three or four large towns in the islands, besides the capital, Manila, and in these one finds, besides out-lying suburbs of native houses made of wood and thatched with *nipa*, many handsome houses built of stone, public buildings, large churches, schools, theatres, and all the usual sights of a civilised town. The houses as a rule are rather bare, and even the best families, who when they ask you to dine will give you an elaborate meal of fifteen courses served on fine china and silver, will, when by themselves, sit round the table in the kitchen, or even squat on the floor, and eat their food anyhow.

My wife and I once last year spent the night with a nice old Filipino gentleman, the *alcalde* or mayor of a provincial town, who gave us a fine big room to sleep in. We saw a screen at the end of the room, but did not look behind. Eventually, however, our suspicions being aroused by certain noises, we discovered that our host and all his family, some seven or eight, were sleeping on mats behind the screen, as we and others of our party had taken their bedrooms!

As with most Eastern people, the law of hospitality is very binding, and the Filipino would share his last crust with anyone. It must be said, however, that he is too improvident to be in the least concerned about parting with his last crust, and he is so accustomed to live from hand to mouth, that as soon as he has earned enough to last a few days he strikes work and retires home, where he smokes in peace, plays on some musical instrument, and indulges in his grand passion—cock-fighting.

An extraordinary trait in the Filipinos is their power of imitation. They can learn very rapidly by note, and can pick up tunes heard on a band, and play them on all sorts of home-made instruments. Every village has its band, and many of them play very well, entirely by ear, and yet they are not truly musical. They seldom, if ever, compose, and they cannot interpret any but the lightest music. They love noise, and I have heard, on the occasion of a banquet, seven Filipino bands, stationed on different sides of the house, playing with all their might seven different tunes! Manila, the capital, is a large and populous city, and since the Americans arrived it has become very busy and lively, quite a contrast to the old, slow, stately Spanish ways. The most striking feature is the hundreds and hundreds of little carriages that rattle about its streets, for no one, not the most insignificant clerk, thinks of walking.

The United States, having at last practically accomplished the difficult task of subduing the Filipinos, is anxious to give them every advantage. She is providing a liberal administration and free education of the most advanced kind to everyone, and it is interesting to see this experiment tried with a race which, despite three centuries of Christianity and much foreign blood, is in the main Oriental. The next few years will see great changes among the 500 millions of the peoples of the Pacific—one-third of the human race—who dwell on the neighbouring Asiatic mainland or in these beautiful but not neglected islands.

I have dwelt on the Filipinos because little is known of them in England, and because they should be of particular interest to us now that they have passed under Anglo-Saxon domination. As the condition of affairs in the islands is also little understood, I may say here that the American war with the Filipinos was practically over last year,

when I passed through and visited all the principal islands, but that brigandage and isolated outbreaks have occurred since, and could hardly fail to occur in so wild a country and among people so disorganised as the Filipinos.

I have to introduce you now to the fourth principal race of the Pacific—the Mongolian. The Asiatic littoral, as I have said, is peopled by this race, and also the islands called Japan, which come at the top of the chain pointed out. I do not need to give a detailed description to anyone here of either the Chinese or Japanese. The former are, I fear, unpopular in this country; but we all realise that they are very clever and hardworking people, though hopelessly conservative and pig-headed. Well, the Chinaman thinks much the same of us, except that he would hardly consider us hardworking or clever. We must therefore agree to differ from him. Whatever we may think, John Chinaman is a very vital force in the Pacific to-day. On the American as well as the Asiatic littoral, in the Dutch East Indies, in Queensland, Borneo, the Philippines, the Malay peninsula — everywhere, in fact, where there is work to be done and money to be made, there is the indomitable Chinaman. He will work under conditions which no other man would stand, he will work cheaply and well, he will get rich when others starve, and as long as there is work to do and money to make he will "get there" somehow. The crying need in many parts of the Pacific is for workers, and for many reasons John is not welcome. In the first place, he is insanitary; in the second, he always remains a Chinaman; and in the third, he undersells the indolent natives, gets all the trade in his own hands, and practically becomes master of the situation. I must mention, however, that as a husband he is extremely popular, for, unlike the Malays, he supports his wife, and does not expect her to support him. The difficulty, especially in the Philippines, is both how to do without the Chinaman and what to do with him, and the difficulty is by no means solved by shutting the door in his face, as is being done in many Pacific territories.

Another interesting Pacific people are the Koreans, who live in this little peninsula. As you know, they have been, until quite recently, shut out from all intercourse with the Western world. They are, on the whole, the finest and handsomest people on the Pacific shores, a fact which they owe partly to their climate and partly perhaps to a Caucasian strain in their blood. They have straight features and rich olive complexions, and they wear the most extraordinary costume to be found in any part of the world. I will not describe it, but will show you some slides. The special interest attaching to these people is that their country, of great importance strategically, is a bone of contention between Japan and Russia; and if ever these Powers come into collision Korea will be the *casus belli*.

I have left the Japanese to the last, but it is a case of last but not least! It is quite unnecessary to dilate on what they are and what they have done. Sufficient to say that forty years ago they were an Oriental nation merely, eminent in art, but centuries behind Europe in knowledge of every branch of science. They were politically almost ciphers, and their Navy was non-existent, while their Army—but I will show you several slides. The entire remodelling of the Japanese social and political organisation was largely due to an extraordinary sacrifice on the part of her hereditary aristocracy. Convinced that the future of their nation was at stake, the Japanese nobles resigned their feudal rights, and in many cases actually went to Europe in menial

positions in order to learn Western ways. Japan, with a small but efficient army, a capital little navy and merchant marine, increasing commerce and manufactures, and an enlightened Government—this is the Japan of to-day. Side by side with her picturesque temples and quaint houses are up-to-date offices and electric tram-cars. Civilisation too often does not make for beauty; but much of Japan still retains its charm and quaintness. The country people wear their picturesque national dress, and live in dainty dolls' houses. Many are poor to a degree incredible to us; but they are clean and fresh-looking, they are full of fun, and smile and chatter to each other as they clatter along on their wooden clogs. Flowers and babies—quaint little solemn-eyed creatures rolled in the brightest cotton garments—these are two things one sees on every side, and it is hard to say which is the prettier.

Finally, there are in the Pacific, or on its borders, some white folk, who cannot be left out of this lecture. First, Russia has crossed Asia with giant strides, and, by means of the Trans-Siberian Railway, is transforming Further Asia. The commerce of the Far East has more than *doubled* since the opening of the Suez Canal, and a vast change is likely to be effected by the new overland route, which will place the extreme Far East within twenty-one days of London or Paris. The Dutch are here, in the East Indies. The Americans, crossing the Pacific, in the Philippines, are a most important factor. Germany and France are there, the former especially alert and pushing, on sea and on land. We ourselves are people of the Pacific, for here we are safely established at Singapore and Hong-Kong, not to mention Borneo. All these places, however, are tropical, and we can only administrate and not actually occupy them. In Australia—a white man's country—we have a race of kinsmen from whom we expect much. The best we can wish them is that they may multiply a little faster. Truth to tell, only part of Australia is suited for white men. New Zealand foster-mothers a race of Britons equal to the old stock, and this island, with its intense loyalty to the Old Country, enjoys nevertheless the distinction of being the most democratic country in the world.

There is another Pacific territory about which I should have liked to speak longer to-day, but time presses. This territory is British; moreover it is also a "white man's country," with a splendid climate where British children can be born and bred. It is rich and fertile, and beautiful beyond all description. It has rivers teeming with fish, fertile valleys, mountains with gold and other minerals, splendid forests, stores of coal, and unrivalled harbours. What it wants is people—more people, young Britons with good brains and muscle and a little money to back them. I have been to this country, and I can assure you that it yields the palm to none, and therefore it is with great pleasure that I close my lecture by giving you a few slides (not as good as I could wish), illustrating the Canadian Pacific littoral—the territory known as BRITISH COLUMBIA.

The CHAIRMAN (Sir N. Bowden-Smith, K.C.B.):—The paper which we have just heard calls for no discussion. I think that you will agree with me, however, in saying that Mr. Colquhoun has brought a great amount of matter into a very small compass, and has taken us in a very interesting way over a very large portion of the ocean and island world. I will therefore ask you to unite with me in giving him our best thanks for his interesting lecture.

THE ORIGIN, EVOLUTION, AND FUTURE OF THE PERSONNEL OF THE BRITISH ROYAL NAVY.

By Commander H. ORPEN, R.N.

Friday, November 28th, 1902.

Admiral Sir N. BOWDEN-SMITH, K.C.B., in the Chair.

ANY consideration of the *personnel* of a sea-fighting service, and therefore of a modern ship of war, must be accompanied by the entire elimination of non-essentials. In other words, individuals and departments, having little or no bearing on the general efficiency of His Majesty's Navy as a sea-fighting service, although ministering somewhat to its general comfort and convenience, must be in the first place disposed of.

To do this, it is necessary to separate the essential from the non-essential—defining as essential the Medical Department, the Executive Officers and Ratings, and the Engineering Department; and as non-essential the Corps of Royal Marines, the Accountant Department, and the Chaplains.

NON-ESSENTIAL.

The Corps of Royal Marines.
The Accountant Department, and the Chaplains.

THE CORPS OF ROYAL MARINES.

This Corps, employed principally in the days of the bounty and press-gang for disciplinary purposes, has long since ceased to perform any duty which could not be, and is, equally well performed by the seamen class. This especially applies to guard duties of every description, which should be considered a necessary item in the training of the modern seaman.

The seamen, however, perform many functions unassisted by the marines, who, from want of training are ineligible, this applying in an exaggerated sense to the officers, who, being military officers pure and simple, are not qualified in any way to take part in the ordinary working of a ship.

The Corps of Royal Marines could, therefore, and should be removed from the sea-service altogether, additional executive officers and ratings being entered and maintained to fill the vacancies thus made. Under these circumstances this corps should be either largely

augmented and given the entire charge of the naval bases both at home and abroad; or it should be abolished, the officers and men being absorbed in the land service of the Crown, with the exception of those men who were willing to be transferred to the seamen class of the Royal Navy for training and future employment.

The Accountant Department and the Chaplains.

Obviously, neither of these two has any direct bearing upon the general efficiency of His Majesty's Navy as a sea-fighting service. Nor would this be affected by the employment of the executive in the Accountant Department, where the work is purely clerical and the life very sedentary. For executive officers thus employed would of necessity deteriorate under the influence of such surroundings, and would eventually retain few, if any, of the characteristics and qualifications necessary for and peculiar to the sea officer. Superannuated executive officers might nevertheless be employed as accountant officers, who would be available for duty in their own ships in cases of emergency.

No further reference will therefore now be made to either of these non-essential bodies, and although several pages might be added in support of their total re-organisation or abolition, the matter, being of a secondary nature, will not here be further discussed. The subject having been introduced solely with a view to perspective, and to render unnecessary any future reference to these departments, which might obscure in any way the points at issue.

Essential.

The Medical Department.
The Executive Officers and Ratings.
The Engineering Department.

The Medical Department.

Although this department but indirectly affects the efficiency of the sea-fighting service, as such it is nevertheless indispensable to that efficiency and to the general well-being of His Majesty's Navy.

As, however, the general working of a ship, or the fleet, is not interfered with in any way by the medical department, and as the pay, privileges, and general conditions of service of this perfectly distinct profession, are very rightly, to all intents and purposes, arranged independently, this department will not be further considered.

The Executive Officers and Ratings.

It is impossible to consider the attributes, qualifications, and functions of the executive, or, to be equally correct, the military branch of His Majesty's Navy, without some reference to its origin and evolution. Fortunately, however, in the case of that most ancient of fighting services, the British Royal Navy, we are able, starting from practically first principles, to quite easily trace the evolution of the seamen and the sea-fighting classes of the earliest days, into the

executive, or military body, which now controls the modern ship and fleet.

In the oar-propelled war-galley three distinct classes of men were employed: The rowers, who propelled the vessel; the soldiers, who represented the offensive and defensive force; and the seamen, who directed the motion, and were entirely responsible for the safety and general management of the whole, as a ship.

The introduction of the sail was gradually followed, as would be expected, by a large increase in the size of the vessels, and the absolute extinction of the oar as a means of propulsion, this development automatically reducing the crew of the sail-propelled war-vessel to the soldiers representing the offensive and defensive force, and the seamen. To the duties of the seamen of the galley days had, however, now been added the actual and manual working of the sails, necessitating their employment in large numbers.

And this increase in the number of seamen employed in each vessel was the natural and direct cause of the evolution of the sea-officers and their various subordinate ranks.

No change, however, took place in the general scheme of control and responsibility. Those qualified to direct the motion and to manage the ship as a whole, being obviously the direct successors of the seamen of the air-propelled galley, and also the only possible officers under the new regime.

The development of the sail and the introduction of ordnance, gradually, as the number of guns increased, brought about the abolition of a separate class to work the armament, there being no accommodation in a ship for the large number of men required to work both separately.

This compulsory amalgamation, or rather absorption of the soldier element, by the sea-officer and ratings put the finishing touches, as it were, to the military qualifications of the seamen class, the sea-officer and ratings now assuming the entire direction and manipulation of the armament, in addition to their military responsibility for the formation of the various ships forming the fighting force, and for placing each unit in the most advantageous position.

The soldiers pure and simple, who were not amalgamated with, and absorbed by, the seamen class, were, from this time forward, relegated to the position of sharp-shooters, and need not be further considered.

From this period the development in the *personnel* and *matériel* was extremely slow; but admirals, captains, commanders, lieutenants, midshipmen, navigating officers and various subordinate ratings were eventually evolved, side by side with the well-known two and three-deckers, frigates, and smaller craft. The introduction of steam, and the consequent abolition of masts and yards, led, however, to the absorption by the executive, or military body, of the navigating officers, whose military qualifications were alone represented by their ability to manœuvre the fighting unit, without any reference whatever to the armament.

From the beginning, therefore, the hard logic of facts has, as in other cases, placed its impress upon the evolution of the sea-service. The absorption of the soldier by the seaman, whose military function as manœuvrer of the whole unit, dominated the minor military considerations of the attack at close quarters, being a simple exposition of

the truth that the whole is greater than the part. And to this simple fact was due also the abolition of the navigating class.

The introduction of steam, originally an auxiliary to sail-power, secondly in superiority to the sail, and finally, as at present, as the only method of propulsion, did not materially affect the functions of the executive. It did, nevertheless, enable the ships in a fleet or squadron to cruise in closer formation, to proceed in any desired direction, and to carry out many complicated movements. This did not, however, in any way lessen the charge and responsibility of the executive, who were now called upon to keep the fleet order with almost mathematical precision under all circumstances; and, in addition, to moor, dock, and berth their ships, of whatever dimensions, regardless altogether of the conditions governing and controlling the possibility of these operations in the days of the sail.

Steam, as originally employed, cannot, however, be considered as a means of propulsion alone, for the steam-engine not only replaced manual labour of almost every description, but it also directly influenced the development of armoured ships, guns, torpedoes, and hydraulic appliances, and indirectly the generation of electricity also these changes compelling a corresponding advance in the qualifications of the executive officers and ratings, without in any way reducing their responsibility.

For although steam had replaced manual labour in, for instance, the capstan engine and boat hoist, the process of mooring a ship or lifting a heavy boat in a seaway had in no way been simplified.

At the same time the armament had been much complicated by the advent of the large-calibre gun, worked by hydraulic power, and by the introduction of the torpedo.

No development in the armament could nevertheless outstrip the knowledge of the executive, who were, to all intents and purposes, the developers, as represented by the staff officers of the gunnery and torpedo schools, which had been established at this period, to meet the new conditions. Hydraulics, guns, gun-mountings, and small arms became therefore, of necessity, the peculiar function of the gunnery school, whilst electricity, first used for mining and other military work, together with the torpedo and explosives of all descriptions, were turned over entirely for development and application, to the torpedo school. To the gunnery school also was allotted the training as divers of all gunnery and torpedo lieutenants, gunners, and specially selected ratings.

The inevitable result of this natural evolution of the sea-officer and rating was to place entirely in the hands of the executive the practical development of the whole armament of a modern ship, including torpedoes and electrical fittings of every description; these officers also compiling the gunnery, torpedo, hydraulic and electrical manuals, and drill-books; and training the whole *personnel* of the fleet in the drill, management, and manipulation of the war *matériel*.

No adequate instruction in mechanical engineering has, however, at any time formed part of the training of the executive officer, in spite of the fact that steam and mechanical contrivances of all descriptions have altogether replaced the old order. It is difficult, therefore, to estimate how far the process of the absorption of the engineering department by the executive would have proceeded, had modern scientific training immediately replaced the traditional methods by which sea officers had been raised during the two

previous centuries. The extraordinary evolution of the executive in spite of all difficulties, points, however, to this inevitable absorption, thereby again uniting the production and direction of motion.

The Engineering Department.

The introduction of steam and its general application led naturally, at first, to the employment of a distinct and separate body of men, now represented by the present-day engineer officers and engine-room fittings of all descriptions.

At no period, however, has the *personnel* of this department received any instruction which would enable them to exercise executive or military control and responsibility of any description whatever, either as regards manœuvring the ship and squadron, or manipulating the armament. But this does not lessen their departmental importance as the generators of power in the modern vessel. The position of a power or motion producer is, nevertheless, absolutely subordinate to that of the executive or military body, who are alone responsible for the application of the power generated, whether represented by the direction and speed of a ship in a fleet, a fog, or pilotage waters; the working of a boat-hoist or capstan engine; or the practical manipulation of the gun and torpedo as weapons of destruction.

With the object, it must be supposed, of reducing the various classes of mechanics in a seagoing ship to a minimum and to counteract, as it were, the absence of mechanical training in the executive officers, the engineering department, as practical mechanics, exercise a joint care and maintenance responsibility with the gunnery and torpedo officers for the armament generally, without, however, receiving any corresponding education in the armament itself.

By this somewhat illogical and unsatisfactory arrangement is brought about the practical transfer of a certain portion of the armament in a seagoing ship from the care of the executive, who are alone responsible for its development, trials, and use, to the care of the engineering department, who have had nothing whatever to do with either its development or trials, and who have but a visionary responsibility for its behaviour as a weapon. Which arrangement not only adds considerably to the difficulties of the executive, but it also re-acts undesirably upon the specially trained armourer class.

This care and maintenance responsibility has undoubtedly, nevertheless, greatly influenced the demand for executive, or military rank and command. To comply, however, with this demand, is to create a caricature and to generate chaos. Besides which, to confer ranks or distinctive marks upon any persons of whatever position, who are not qualified to perform the duties appertaining to those ranks, not only lowers the whole prestige of those ranks, but it altogether fails to either alter the status or to disguise the calling of the class upon which such ranks have been conferred.

The functions and qualifications of the members of the engineering department are therefore, as ever, entirely those of the mechanical engineer, the practical application of mechanical knowledge to the hydraulic fittings, Whitehead torpedo armament, and dynamos, being secured by the institution of modified hydraulic, torpedo, and electrical courses.

The Future.

The future efficiency and well-being of the *personnel* of the British Royal Navy, or indeed of any similar organisation in which sudden changes are for obvious reasons impossible, depends almost entirely upon the steps taken in the present to meet the exigencies of the future.

This especially applies to the consideration of any radical alteration in the general arrangement of the *personnel*, here represented by the executive officers and ratings, and the members of the engineering department, the highly technical character of the education in either case rendering sudden changes impossible, and demanding, therefore, that prompt and enlightened action in the present shall guide the evolution of the *personnel* of to-day into a *personnel* adapted to future requirements. The present system will not, however, effect this object.

And the procedure governing the entry, training, and employment of the officer class should be entirely revised, and methods adopted to combine in each officer the mechanical qualifications of the engineer with the sea military knowledge of the executive.

The absolute absorption of the engineer in the executive will, however, be the inevitable result of this combination. For all officers, however employed, would establish their claim to advancement, in the satisfactory performance of their particular departmental or subordinate duties. And all would be legitimately intent on obtaining, in the first place, the charge of the ship, and, in the second place, the command of the squadron, which willing or unwilling, would relieve them of departmental responsibility of every description, such being entirely the care of the individual captain and of the departmental chiefs in each ship.

The recent amalgamation in the United States Navy of these two classes of officer, who had all entered the same academy on the same footing, and who had all received a somewhat similar education, is obviously a simple matter, when compared with the application of any such scheme to the British Royal Navy, in which Service the executive officer and the engineer are trained separately, the executive officer receiving no mechanical training whatever, and the engineer no instruction of practically any description in sea military duties. Hence, although the junior members of both classes might qualify and perform either duty, it is upon the entry, as one class, of a sufficient number to efficiently perform both duties, that the supply of the executive officers of the future must depend. For mechanical instruction, an absolute essential for all sea officers, grafted in, from the very commencement, with sea military training, will alone produce the class of officer suitable for service in the modern ship, whatever line be followed in attaining the position of command.

The general adaptation of the electric motor will eventually place the whole of the auxiliary machinery in the hands of the executive, as represented by the torpedo officer and the armourers. At the same time the functions of the steam department will be automatically reduced to dynamo and propelling machinery only. Unless, therefore, the executive receive sound mechanical training, their position must inevitably become one of great difficulty, for to the present electrical plant, of which, with the exception of the dynamo, the executive have the entire charge, will be added every conceivable

description of engine, from an air-compressing machine to a boiler feed pump. And although perfectly capable of managing the present armament and engines not driven by steam, a very different state of affairs is obviously introduced by the universal application of the electric motor.

The training of the future executive officer would of necessity occupy several years, but should not in all exceed the period now occupied in converting the naval cadet into a sub-lieutenant. The service of subordinate officers in sea-going commissioned ships should, however, be discontinued altogether, the gunroom and the naval instructor being abolished in consequence. A continuous course of professional instruction would thus replace the present system of interposing a long term of sea service between the opening and closing phases of the instructional period.

The advantages of the sea service system, adopted in the days of the sailing vessel are, however, altogether outweighed by the disadvantages attending its continuation in these days of steam and electricity. Sea service, the only argument in favour of such a procedure at any time, is now represented by three to four years' service in ships, which spend the greater portion of their time in harbour.

Night watches, unhealthy climates, inadequate accommodation, irregular exercise and insufficient leave, not only injuriously affect the general development, but they materially assist the drills, routine and boat-work, which interfere with the instructional classes at all hours, to return the acting sub-lieutenant to England for his final courses and examinations, practically ignorant of all modern science, and knowing little that he did not know when he left the "Britannia." He has, nevertheless, expended three to four of the most important years of his life in absorbing a limited quantity of gunnery, torpedo, steam, and seamanship; and he eventually emerges from college a fully-qualified commissioned officer, having been under instruction for nearly seven years.

This system undoubtedly handicaps the executive officers very severely, not only when dealing with the other branches of their own profession, but also when brought into contact with foreign naval officers of every description, none of whom have been trained on these principles. The extremely satisfactory manner, however, in which the British sea officers, when specially trained, have carried out any duty that has ever yet been allotted to them, is, nevertheless, an assurance that, if trained systematically, there is no function they cannot perform with very great credit to themselves and to the Service to which they belong.

In considering, therefore, the entry of cadets, who, when qualified, would eventually carry out the duties of the present executive and engineer officers, the number required to perform both functions and the length of the training required must naturally govern the number to be entered in each batch and the age of entry.

The total number required would, however, be much below the total of the two combined. For no officer would have anything whatever to do with the design, construction, and dockyard repairs of either boilers or engines, these being entirely in the hands of the Admiralty and dockyard engineering staff, who should be, like the Royal Corps of Naval Constructors, entirely civilian, and the very best men that could be obtained, either by special training in the Government establishments or by direct entry. A further large

reduction would also be effected by the employment of the artificer-engineer class in all small vessels, and in watch-keeping and other duties in all ships carrying one or two officers for engineering duties, who are now represented by the chief and senior engineers. And all officers being mechanical engineers, the number of ships in which it would be necessary to carry commissioned officers for engineering duties could be also considerably reduced.

The age of entry, as has been before mentioned, is governed by the length of the training required, and also by the age at which it is considered advisable to send the officer to sea. This, therefore, should not exceed thirteen years, which, allowing a period of seven years for the training in all branches, would send all officers to sea at twenty years of age, which is decidedly below, it should be noted, the age at which the present sub-lieutenants leave college. All cadets on entry should, however, sign an agreement, rendering them liable, *nolens volens*, for service in the steam department, thus following the procedure adopted on the abolition of the navigating officers.

In arranging courses of instruction for present-day use, the coaching-day methods of education should be as far as possible eliminated In those days the dead languages, Euclid, and various mathematical exercises, were the only known methods by which the brain could be developed and a standard of comparative individual merit arrived at.

Steam, chemistry, electricity, and a thousand other developments, have, however, of late years effected a complete revolution. And although the ancient standards are interesting as examples of the capabilities of man under peculiar circumstances, they are no longer possible, if time is to be devoted to even partially mastering the sciences which practically govern modern life, and which are in themselves not only most excellent and adequate brain developers, but also the very best test of the comparative abilities of the modern sea officers. These sciences being entirely part of and essential to the very existence of every modern Navy.

For these reasons academical instruction should be entirely governed by the extent to which each subject directly affects the various functions of the sea service.

This consideration obviously abolishes altogether the study of the dead languages, and limits mathematical research to the axioms, postulates, and enunciations of certain propositions in the books of Euclid; simple co-ordinate geometry; the quadratic equation standard of algebra; the navigation requirements of plane and spherical trigonometry; and the study of statics, kinetics, and hydrostatics, solely with relation to the flight of projectiles, and the construction, displacement, and stability of ships, torpedoes, and submerged bodies. The mathematical pulleys, wedges, and screws, the imaginary cones, which float beneath the surface of the text-book liquid in the academical tumbler; and the higher, or mathematical mathematics of every description, which are the particular function of the naval constructor, and of the designing and constructive marine engineer will be omitted altogether.

In submitting, nevertheless, any scheme of education, the accommodation and conveniences of the several colleges and institutions already in existence must of necessity be considered, with a view to the accommodation of seven or eight hundred officers now at sea in various ships, and the enlargement of the Dartmouth, Devonport, and Portsmouth colleges. By transferring, however, the gunnery and

torpedo training of the subordinate officers from Portsmouth to Devonport, the Portsmouth college could be abolished. And the erection at Devonport of a suitable college, with adequate recreation grounds in the vicinity of the new gunnery school, would enable the whole of the gunnery, torpedo, and mechanical instruction to be carried out in a first-class naval base, possessing unrivalled facilities for sea-training of every description.

The entry examination of cadets should be, of course, a direct introduction to the "Britannia" system of study. Physics, as represented by light and sound, replacing Latin as a qualifying subject.

After entry into the "Britannia," where all cadets should remain three years, seamanship, navigation, and heat would be introduced to the exclusion of the more rudimentary subjects. Practical mechanical training, the study of steam and the steam-engine, electricity, chemistry, co-ordinate geometry and nautical astronomy being grafted in at the commencement of the third year. And the cadets would pass finally in mathematics at the end of that year, before proceeding to Devonport for the final courses of instruction, occupying four years.

On arriving at Devonport work would be at once commenced in the Royal dockyard workshops and ships, this practical mechanical training being supplemented by the more academical instruction in steam, chemistry, metallurgy, electricity, nautical astronomy, seamanship, heat, mechanical drawing, and the construction, displacement, and stability of ships. The final examinations in the whole of these subjects being held at the end of two-and-a-half years. Thus eighteen months would be available for six months' gunnery training, three months' torpedo instruction, a pilotage course of three months, and for six months' practical work in torpedo-boat destroyers and torpedo-boats manned by skeleton crews. During this period, each member of a class forming the crew of a torpedo-boat destroyer, or torpedo-boat, should spend one-half of his time on deck, manœuvring the boat and working the armament, and the other half below, on duty in the engine and boiler rooms. The whole manual labour should, however, be performed as far as possible by the class under instruction, who should also keep the boats in repair.

When considering the mechanical training of the officers, the mechanical possibilities of the ordinary ship must be taken into account, these possibilities altogether limiting their operations. Hence, three-and-a-half years has been considered sufficient training for sea-going purposes; for, regardless of the extent to which officers may be trained for the sea-service, all repairs beyond the scope of a ship are carried out of necessity by a Royal dockyard, or a private firm, and are therefore superintended in each case by men who are far more capable of performing such work than any sea service mechanics who, whatever their original qualifications, have in all probability for years undertaken no mechanical work much above the capabilities of an ordinary fitter.

On the completion of the training at Devonport, commissions as sub-lieutenants would be granted to the successful candidates in the final examinations, the class of the certificate, as now, governing the promotion to lieutenant. The appointment of all officers who volunteered, or were selected, for duty in the steam department, or as navigating officers, should, however, as a general rule, be final, the officers selected for duty in the steam department receiving, if possible,

appointments in command of torpedo-boat destroyers for at least six months in every four years. The selection of officers for service in the gunnery and torpedo departments might nevertheless well remain as at present, but extra courses would in all probability be necessary, simply because the development of the war material, which is of little commercial value, depends very largely upon the efforts of the service specialists.

All officers employed in the steam department would thus obtain, under ordinary circumstances, from twelve to fifteen years' experience in steam-driven engines before promotion to commander, and from seventeen to twenty years' experience, if similarly employed after promotion to that rank. Either period is, however, sufficient to ensure a continual supply of perfectly competent officers for service in the engine and boiler rooms, who would in the natural course of events entirely replace the present engineer officers, the process being identical with that evolved when the navigating officers were abolished.

The employment of commanders or lieutenants in navigating, engineering, and torpedo or gunnery appointments, must depend, as in the case of the executive officers of ships and the commanding officers of small vessels, of necessity, upon the relative sizes of the two lists, and the arrangements for promotion. It is immaterial, however, who is employed upon any particular service, so long as the chances of advancement are affected, not by nature of the employment, but by the manner in which the work has been performed. For, given equal chances, the officers who obtain their promotion to captain through the steam department will be in every way as well prepared for the responsibilities of command as their similarly trained contemporaries who may have qualified for promotion in the torpedo and gunnery departments.

The enforced subordination in a sea-fighting service of the mechanical engineer who is not qualified under any circumstances to command the ship, taken in conjunction with the nature of the engineering work required, as regarded from the engineering point of view, must inevitably affect the class of candidate for service afloat.

And no concessions will ever attract into any sea service the class of men who, as engineers, willingly enter the great manufacturing firms. The Navy is not an engineering profession, although mechanical contrivances of every description are very largely employed. Ships and boats are not built as exhibition rooms for the latest type of engine, the engine being merely in position as the most suitable article for producing the required result, to be in its turn replaced by any invention which in the opinion of the executive will be either more reliable, or perform the same work in a more satisfactory manner.

Service in ships is of necessity a compromise, engineering afloat being complementary to sea-training. The rate of promotion in any department will however, alone affect the supply of officers volunteering for service in either. If, therefore, all officers be made eligible by training for promotion to the highest ranks, management alone will be required to ensure for the steam department the services of the best of the very able men who will always, it is to be hoped, compose the officer class of the British Royal Navy. Friction and professional jealousy will be thus reduced to a minimum.

And as charge pay, in addition to full pay, would represent the whole emolument of officers serving in this department a large saving

in the pay of the commissioned officers, which in some cases at present exceeds that of the officer in command, would also be effected, and to this would eventually be added the pay and pensions of all naval instructors not required for service in the shore colleges.

The re-arrangement of the officer class would not, however, necessitate any re-organisation of either the seamen or stokers, the number of artificer engineers alone being increased, to enable them to take over the watch-keeping and other duties now performed by junior engineer officers.

Stokers nevertheless, entered as boys, should reach warrant rank through the same number of grades as the seamen class, and should then be appointed to ships in the proportion of one to each or each pair of boiler-rooms. And boys, ordinary seamen, and second-class stokers, being to all intents and purposes trained alike, their periods of service on deck and below should be altogether dependent upon the number required in either place without reference to their rating.

Electricity, the particular function of the executive officers and ratings, is rapidly altogether replacing the steam-driven engine in the general internal economy of the modern ship. Yet combustion and the generation of steam are still necessary for the propulsion of the ship, and for the production of electrical energy. The installation of the electric motor and of transmitted electrical energy of every description will, however, greatly reduce the work and responsibilities of the steam department, and at the same time render imperative the training of the executive in mechanical engineering, this again automatically still further decentralising the mechanical charge in a ship and adding considerably to the value of the *personnel* of the Gunnery and Torpedo Schools as experimentalists.

Now, therefore, at the parting of the ways, and in anticipation of the inevitable, is the opportunity for again confiding the whole functions of a war-ship to one body of officers united in a common origin and animated by similar ambitions.

Vice-Admiral the Right Hon. Lord CHARLES BERESFORD, C.B., M.P. :—Sir, I should like to congratulate the writer of this paper very warmly on its boldness, and I am sure he will forgive me if I criticise certain parts of it. The idea that seems to have dominated him when writing the paper is that we have arrived at a time in the Navy when we have to institute a different class of training entirely for our officers, if we are to maintain the Service in that state of efficiency in which all want to see it. With regard to the first part of his paper, I notice that he eliminates from his proposals a class of people whom he deems as non-essential, and he mentions the Royal Corps of Marines; and he says that they have little or no effect upon general efficiency. In that part I cannot agree with him at all. The Marines have never been found wanting whenever they have been called upon, whether on shore or afloat. They are, as far as efficiency goes, and in their general bearing, second to none in the United Kingdom. I rather think his argument is wrong in another way. It is not a case of the bluejacket being able to do what the marine can do, but what we are now rather coming to is, Cannot the marine do all that the bluejacket can? I can illustrate that by my late experience in the Mediterranean. Undoubtedly the marines are hard to beat. They often beat the bluejackets hands down, and in most ships they are second, or third, or first in the art of gunnery as good shots, and I should be very sorry to see

the marines abolished or in any way removed from the Royal Navy, as I consider they are an integral part, and one of the grandest parts we have as a community in the Royal Navy. I agree with the lecturer when he says the officers are not treated properly. Their merits are not recognised as they should be, and there is no doubt they always fall between two stools—they fall between the Navy and the Army. If the marines are wanted ashore the officers are not employed in those high positions which they merit. And I think we could make a great deal more use of the officers and their ability than we do. In many ships they are the best signalmen in the ships, and the late Commander-in-Chief of the Mediterranean Squadron employed two of the marine officers on his intelligence department, when the work they did was perfectly excellent. Some of the captains of the ships used a marine officer on their intelligence staff. I did so in my flag-ship, and the amount of knowledge useful to me and of use to the ship generally found out and exemplified by these officers was perfectly excellent. There are plenty of positions of that sort in which we might use marine officers, and I dissent very warmly from the lecturer in his idea of abolishing the marines, or varying the conditions in which they are employed in the Royal Navy. He also eliminates the clerical department. It is possible that might be done, but there is one thing the naval officer can very rarely do, and that is, write a letter. The accountant officer always can write a letter; and there are moments when the wording of a letter may be of most material importance to the Fleet, or even to the country. Therefore I think we should keep the accountant officer for that purpose alone. But there is also a great deal of work in the secretarial department which I do not think executive officers are half as well qualified to carry out as are the accountant officers. In war they were very useful in all sorts of positions; and I dissent from the lecturer again in wishing to get rid of them. He does not give any reason why he wishes to get rid of the chaplain. I do not know whether he is a free-thinker; but I have a strong objection to getting rid of the chaplain. I am sure my brother officers in the room will agree with me in this, that both in the Navy and the Army, a good chaplain is of the greatest benefit in a regiment and in a ship. He is a go-between between officers and men, and he often keeps things smooth which otherwise would not be so smooth. And also there is a time in the Services when you may meet with your death, and, for myself, and I speak for many of the men too, I would rather be comforted by a man who is, I may say, accredited to God, than the ordinary officer or man, who might be friendly to me. With regard to the proposals that are based upon the old days, I am perhaps rather radical, but I never will agree that we learn very much from the old days. I will take the greatest man we ever had—Nelson. If we were to go into action as he did we should be absolutely smashed. He went into action with a long line, and generally broke the line of the enemy. What we want to do is to get in the line the enemy was in, so as to cross his T, and have our ships so that he cannot fire a broadside into them. So I do not think we can take the old days as applicable to what might occur now. The part which I heartily agree with in the paper is this difficult question of new training. How we are to combine the mechanical qualifications of the engineer with the seamanship knowledge of the executive officer, will be a very difficult thing to decide. But because it is difficult is no reason why it should not be faced, and I entirely agree with the view of the lecturer that this thing has got to be grappled with, in order for us to have a Navy suitable for modern requirements, as far as knowledge on the part of the officers goes, although I do not quite agree

with all the suggestions which he makes. Still, I know him well enough to feel assured that he puts the suggestions forward so as to make us think, and to provoke discussion, which is so good for the Services. He quoted the case of the United States. I was over there the other day, and I went thoroughly into the position of the United States' engineers and executive officers. At present it is not at all satisfactory, because they have only one engineer officer in the ship, and if that engineer officer happens to get ill there is nobody between the captain and the senior engine-room artificer to do the work. I do not think that is a very good plan. I think the lecturer's plan should at any rate be tried, of joining all the young officers—boys—in one batch, and let those who like go into the engine-room profession, and those who like go into the executive profession. But perhaps his idea is best, namely, to make them all go through both. But I do not think you will get a man who is equally good in the engineering profession and in the art of managing men in the executive profession. He should have some knowledge of it, unquestionably; but I do not think you will be able to say that every officer is as good for an admiral as for an engineer, or *vice versâ*. There is a question which he suggests as to young men going to sea as young men. Here I am afraid I must differ from him altogether, because the principal part of the Royal Navy that affects the efficiency when it is suddenly called upon to act is the art of administration—the administration of officers and men; and I am quite certain you will never get men to pick that up as quickly as boys. May I exemplify that? A midshipman goes away in a cutter, when quite a lad. He cannot go continually to the officer in command and say, "I cannot manage my boat's crew; this and that is troublesome"; he has got to do it somehow. In other words, he has got to use tact; he has got to use the art of administration, and he can only get that as a boy. It is most essential we should send our officers to sea quite young, as we do now, and get them to learn that art of administration which, after all, is the whole basis of governing the Fleet, whether it be at peace or war. The lecturer, at the end of his paper, speaks of the parting of the ways. I agree with him that we have arrived at a parting of the ways. I congratulate him most warmly upon the boldness of his paper, which will provoke discussion and make us all think. But I would ask those present, my brother officers especially, to be careful that we do not go the wrong way.

Captain Sir JOHN COLOMB, K.C.M.G. (late R.M.A.), M.P.:—I would not occupy the attention of the Institution before so many others here more competent to deal with the question, were it not that I am anxious to say something upon it, and I am obliged to leave early. I have been to some extent anticipated in my remarks by my noble friend Lord Charles Beresford; but I would thank the lecturer on behalf of those whose interest is in the Naval Service, and whose duty it is to uphold everything which makes for the good of the Navy, for giving us the benefit of his practical technical knowledge by coming forward and reading this paper. I would also congratulate the Institution upon having a naval paper at all. I only wish we had more enlightenment, through the instrumentality of the Institution, on naval subjects than we have. Old fossils like myself are out of touch with the technicalities of the time, and with the thoughts prevailing in the minds of the younger officers, with whom the future lies. Therefore we are under great obligation to the Institution, and to the lecturer, for his kindness in reading this paper. I will say one word about the gallant

officer's views put forward in the paper in respect of the origin and causes of the evolution of the naval force as we know it now. Nobody in his senses would set to and create a Navy, as regards *personnel*, composed as it is now, if he had a clean sheet. But I differ from the lecturer in so far as I think he attributes far too much to changes in methods of water propulsion as being responsible for what the Navy is to-day, and too little weight is given to other causes. The real truth is, that while no doubt the changes in water propulsion had a commanding influence, there were a whole series of causes which have produced the Navy as it is now, and which he so desires to reform. I may just run through some of these other causes. There were constitutional exigencies, political expediency, commercial instincts, professional rivalries, sentiments, and even jealousies, which produced what we have to-day. We must remember that. I cannot stop to give instances justifying this contention, but I will point out to him one thing: Anomalies that exist in the constitution of the British Navy are not present in the French. If his contention was correct, that what we see to-day in our Navy is merely due to the influence of changes of water propulsion, we ought to find exactly the same conditions prevailing in the French Navy as in ours, which is not so. The constitutional system and the administrative systems of France have always differed from those of England. Therefore we have never produced a great naval statesman like Colbert. The history of our Service has been a series of makeshifts. It is the resultant of a conflict between the forces of fact and necessity, and the power of tradition, which has produced that composite body, the Royal Navy of to-day. For example, that special branch in the Navy, the accountant branch, is an anomaly. It does not exist in the Army. The gallant lecturer would not surely try to show me or anybody else that the evolution of this separate and very extensive branch of the Navy is entirely due to changes in water propulsion. And with regard to the marine forces as we see them to-day, I think my gallant friend the lecturer does not know that the origin of the marine force in the Fleet of to-day is due to the resistance on the part of a monarch of England to be cheated any more by captains and pursers. I have said sufficient to caution my hearers against assuming that changes in water propulsion are the direct and only cause of the difficulties we are placed in to-day. My noble friend in front of me has differed from the lecturer in regard to the Marines. I decline to deal with any Service, especially with the Navy, from the point of view of the grievances, or the position of any particular branch of officers. We have something far higher and more important to look to, namely, the general interest of the whole of the Service and the great naval machine. Although it is rather a repetition, I wholly and absolutely differ from the position taken up by the lecturer, that the Marine force of to-day, whatever its defects are, is a conglomeration of units only ministering to comfort and convenience; and I agree with my noble friend in what he has said. I am bound to say I think the gallant lecturer does not sufficiently appreciate the fact that it is physical and mechanical conditions which have approximated the seaman to the marine. It is not the marines which have changed; it is the situation and circumstances which have, as far as functions go, put the seaman and the marine on the same level. I see the lecturer himself does not quite believe in the theory he propounds, for I observe he says that if these units of the Marine Service are willing to change their name and their dress, and to receive higher pay, then they would become the seaman class, they would cease to be ministers to convenience and comfort, and become efficient elements, and a sea-fighting class! I think what you have

to realise is the fact that physical conditions have produced a certain state of things, and in regard to the officers and the men of the Marines it is simply a question of the training which you choose to give them. I now come to the final point which I would like to make an observation upon. I think, as far as the Marine branch of the Navy goes, the policy to be pursued is to set your mind on alterations in the system of training for the gradual absorption of the Marines into the Navy, and so unify the Service. I agree with that, in regard to the officers and all. And the difficulties are not so very great. When the gallant lecturer came to the engineer and the engine-room artificer and their unification, he astonished me by the process by which he proposes to accomplish it. He proposes to take all officers for the sea service, and submit them to mechanical, scientific, and mathematical training, to take them as boys, and not to send them to sea for a first time until they are about 20 years of age. If my gallant friend's proposal is that, I repudiate it, and I share the opinion of my right honourable friend here. If it be practicable, why not take the young marine artillery officer, try the experiment, and see if you will make an executive officer at all equal to the officers who have had early sea training. I do not believe you can get the qualities for which our naval officers are distinguished—adaptability, appreciation of a position suddenly changed, a sense of responsibility, fearlessness in doing what he thinks best—unless you give them early training, unless you take them to sea while they are young. With regard to the engineer question, I would only say this: I myself am entirely of opinion that we are more than at the parting of the ways on this question, and the sooner the Admiralty make up their minds what they are going to do, the better for the Naval Service. I think at present we are in great confusion, and the matter has to be faced. My own view is that the first step is to give the present engineer officers opportunities for learning those executive functions as far as they concern the ordinary handling of groups of men as fighting units. I think that is the first step, and I doubt very much if you will ever be able to get in one man all the qualities necessary for a scientific engineer and all the aptitudes and requirements necessary for an executive deck officer. I think it will be a very long time before you can put on one and the same man the duties of the bridge and the duties of the engine-room. I again thank the lecturer for giving, and the Institution for having secured, a paper which is of such incalculable good as throwing light, and very clear light, upon those problems which are pressing for solution now.

Commander FREDERICK K. C. GIBBONS, R.N.:—Starting with the Marines, I think there is another way in which we may look at the doing away with them. It is not so much the question of the officers not being used as they ought to be, although that is a very important point, especially as, after a good many years of experience as gunnery lieutenant, I have found many of our best officers are to be found among the Marines. The difficulty comes in in getting your recruits. There are a large class of men whom wearing red coats or other causes attract, and you can get those men in large numbers, and I doubt if you could get them to enter as bluejackets. You must look at it from that point of view. They are also cheaper. With regard to the midshipman's training, I have a good many friends among American naval officers, and I was once speaking to the first-lieutenant of a ship, which was lying alongside of us. He said, "I admire your midshipmen. My fellows come from college when they are about 18 or 19, and they think they

know as much as I do." With regard to the engineering department, I think that question is practically already decided on. I do not agree at all with the idea that one man and another should go right through both departments. It would be better to take them both as cadets and give them two or three years of their training, and then say, "You go to the engineering department," and "You go to be trained as a midshipman," both having had a common basis to start from. But even then, I am afraid, you would find that the best men would like the executive. I doubt if it would answer that way, unless you forced them to choose early. With regard to fixing a separate rank of warrant officer engineer, who is to do all the watch-keeping duties, we shall have the whole question raked up again in a few years' time. These people would say, "We are doing the responsible watch duties of the ship, and ought to have rank." Also, a better class would come in to do it, and would be backed by a trade union, who would agitate, also bring Parliamentary influence to bear, and the whole question would be opened up again. Harking back to the marines, I think it would be a good thing if we followed the American plan, where the system is to take the officers for the marines from the midshipmen who have done two years' training at sea. At the end of that time they can go in for the marines if they like, but they do not get the same chance as before. It is better pay to start with, and good for people who do not like watch-keeping. Except for actually keeping watch he is a very useful man at signalling and boat-pulling, and he instructs his own men, and he is a good fighting unit.

Major Cecil Q. Henriques (1st Middlesex R.E.) (Vols.):—I am here as a Volunteer officer, but I wish to address the meeting as a mechanical engineer. I am a director of one of those private firms which have been mentioned, and I would say a word about the Engineer question. I was very pleased to hear Commander Orpen's remarks, because, what I gather is, that he wishes to amalgamate everything, Marines, Executive, and Engineers. In the Army and also the Volunteer Service, to which I have the honour to belong, we have Royal Engineers, having the same standing as the artillery, cavalry, and infantry. What I feel, Sir, as a civil engineer and as a mechanical engineer, is that I cannot advise my friends to send the best class of boys into the Navy as Naval Engineers, knowing that they take such a secondary position at present; and that they are always beneath the Executive. If anything could be done on the lines of this paper to improve the position of the mechanical engineer, in the Navy, I, as a member of the public and of the Engineering profession, should welcome it most heartily. I think the Navy is more dependent on the mechanical engineer than the naval officers seem to admit. They do not seem to recognise the importance of the engineer in the battle-ship. The machinery in a battle-ship is the heart of the ship, for the manœuvring: and the guns are also the heart of the ship. Without the guns and engines we are nowhere. If you could do anything to train executive officers and make them *competent* engineers, not *amateur* engineers, I should welcome it with great delight. There is another thing which the lecturer has mentioned about electricity in moving the auxiliary machinery of the ship. My firm (John H. Wilson and Co., Limited) have made a great many auxiliary engines for the Royal Navy (nearly 100), and they were all steam, and we also do a great deal for the merchant service. We have consulted with some of the most eminent shipbuilders about electricity for the merchant service for working auxiliary machinery. The deck machinery of a big cargo boat in the merchant service takes about

1,000-H.P. It would be a very big thing indeed to put in an electric generator of 1,000-H.P. in a ship, and for everything to be dependent on that dynamo not going wrong. That is one of the difficulties which merchant-ship owners raise. They will not at present have electric auxiliary machinery, when rough usage and damp are very much against it. That has kept me back from going in for electric machinery for merchant-ships. I believe the Navy has done it, but whether they will adopt it as a permanent thing is very questionable. The Navy wants something which will stand *anything*, which will not break down at a critical moment, and I therefore thought I might venture to bring this matter before the meeting.

Mr. W. S. Clayton Greene (Barrister-at-Law, late Assistant Engineer, R.N.) :—Perhaps I, too, am something of an outsider here, as my name does not now appear in the Navy List. But I have had a little naval experience, and so I make bold, even in the presence of so many senior and distinguished naval officers, to express my view here. I think confusion arises from this constant repetition of the expression, with regard to the engineer, that he is "*underneath* the Executive." Confusion arises because it must be admitted by every rational person that there cannot be more than one person in command of the ship. You cannot have two men in the conning tower. It is not the engineer's contention that he ought to have the position of an executive officer in the highest sense of that expression. He does not ask, and never has asked, for command of the ship. What he does ask for is recognition. It is recognition of his work in his own sphere, not only in the matter of military rank and command in accordance with his official status, but also for the titles properly attaching thereto which he cries out for, and I submit he deserves to have it, and sooner or later he must have it. There is a great cry for this executive rank. Commander Orpen has criticised that, not very kindly. In his innuendo as to the engineer's desire to "disguise his functions," there is contained an expression which Commander Orpen will, I think, live to regret having made use of. The engineer officer does *not* want to "disguise his functions"; what he wants is to have an appropriate position in his own sphere. Commander Orpen has alluded to the chaos which is to follow upon the bestowal of executive rank upon the engineer. I ask, Sir, is not the existing state of things a veritable chaos? I can illustrate it simply. Let us suppose you have a first-class battle-ship in action, and the lieutenant in the barbette has been killed. The machinery there is probably hydraulic, perhaps some of it is electric, and it has broken down. The gun is disabled. You have no other commissioned officer in the place. It is eminently a case for high intelligence and resource. The engineer officer, if present, would know what was best to do, and he would not be far away. Now that officer cannot give a single "executive" order in that barbette, as matters stand. It is true that what he says may be listened to, and possibly in some cases with respect; but he does not command, and a self-sufficient petty officer, on whom the actual command devolves, can completely overrule him. That is only one illustration of the disadvantage under which an engineer officer to-day goes to his work, and, taken alone, it is, in my opinion, sufficient to put opposers of the engineers' claims completely out of court, though I could enumerate many others. Sir, I think the suggestion which you will see I make, that the engineer officer should have executive rank and titles, is not very impossible. The able lecturer advocates the introduction of the lieutenant into the engineer's sphere. You can put it the other way, it comes to the same

thing, viz., assimilation or amalgamation of the two branches. The engineer, whether he be dubbed "combatant" or "non-combatant," has got to have control—absolute control—over men; his word must be obeyed in engineering matters by both seaman and stoker. What, then, is the harm in giving the engineer officer, as he is found to-day, that executive control? Why not? Is he not an educated man? I do not suggest for a moment that he should ever study tactics, or anything of that kind, which, of course, is the proper department of the executive officer *par excellence;* but I do urge that he be given a better position in the way of rank and prospects than he at present has. The need for it is obvious; the dwindling of candidates for Keyham College, and the almost entire absence of outside men properly qualified, is a very bad state of things. It is because you cannot get educated gentlemen to submit themselves to the present conditions of service. And you must get them. Educated gentlemen only can do the work. The executive officer is very clever, no doubt; he can, if he likes, master all that the engineer knows. But he has other functions, and I think that has been very properly put to-day by a previous speaker. He has wide administrative functions, and he cannot well be down below in the engine-room. It would be interesting to know if it is the lecturer's idea that his ideal engineer executive officer is to be below. There must be a commissioned watch-keeping officer below. On these grounds I do venture to think that a case is made out for a radical improvement of the engineer's position. I say so much in all humility. I confess at once I am not a naval officer now. I hope I have not seemed over-confident in the presence of so many officers of high rank in expressing my views.

Rear-Admiral W. F. S. MANN :—Sir, I should like to ask one question. Did I gather that if the lecturer's scheme is carried out, it will be quite possible for an officer to be practically all his time in the engineering department up to captain's rank, and on attaining that rank to take command of a ship?

Commander ORPEN :—Yes.

Rear-Admiral MANN :—There is much in the paper that I agree with, it having been in my mind for some years that officers should have more mechanical training, but I cannot at present bring my mind to that. All who have been through the Service know that we are drinking in something all the time, so that when the time arrives for us to stand on the bridge and manœuvre the ship, we do it intuitively from knowledge picked up. I cannot think that is possible for a man who has spent all his time in the engine-room—it wants a long training. I believe the time has come for all officers to be more or less engineers, but there must be a period in their training when it shall be decided which goes for command, and which for the engineer department. I think most officers believe that going to sea young has assisted towards making the naval officer what he is. But, if continued, how are you to give the mechanical education which I feel is necessary for officers of the present? You cannot make a midshipman a schoolboy—we all know that "going to school" on board seagoing ships won't do it. I know I got but very little knowledge that way. I loved the deck work—most boys do. You could at one time go to sub-lieutenant with but little education. We have to recognise that things are different now. When you have to manage a great machine—as a ship is—you must have mechanical knowledge and training. Can you give them this training at sea, sending them as you do now, or must we have

them trained as the lecturer suggests? Then, as to the Royal Marine Corps, I did not take the lecturer to mean—and I am sure he did not—that our R.M.A. and R.M.L.I. are not most serviceable men. Nobody could have but one opinion of our gallant Joeys. They are intelligent and splendid. What I understood was, that in his opinion it would be preferable to have, in a ship, naval lieutenants, seamen gunners, and mechanics in their place. If necessary, sentiment must give way to efficiency, but such a change requires careful consideration. I do not know the name of the gentleman who spoke up so bravely for the engineer department. That question has also been in my mind for some years. I see no reason against our engineers having so-called executive rank: why should you not call the engineer officer "Commander" R.N.E., "Lieutenant" R.N.E., etc., giving him rank and authority such as executive officers have now? I believe it would work well. Although now on the retired list, I feel it a duty to give expression to such views as come to me.

Commander ORPEN, in reply, said:—I think, Sir, that Lord Charles Beresford was mistaken in supposing that I intended to disparage the Corps of Royal Marines. I merely insist that their functions do not necessitate their retention as a separate corps; in other words, that most inefficient of all arrangements, an organisation within an organisation. The senior officers, also, invariably fall between two stools. They are not qualified for naval command, and no steps whatever have as yet been taken to demonstrate to the War Office the superiority of service in a ship, over field training, for a soldier. Touching the points raised by Major Henriques, I would point out that it has been my privilege to attend quite recently, in an official capacity, the trials of the first electrical boat-hoists in the Navy, which, for speed and general efficiency, compared most favourably with their steam predecessors, the outcome of years of development. Nothing, in my opinion, can possibly prevent the displacement of the steam auxiliary machinery by the electric motor, and the consequent ruin of the makers of such, who are either unable or unwilling to commence the manufacture of the electrical substitute. It has been stated that as the engineer officers have no power of punishment, they have therefore no control over their men. This is, however, an absolute fallacy, for they have precisely the same control as the gunnery and torpedo officers, who, never being officers of the watch, have never the power to administer any punishment whatsoever. But the gunnery and torpedo officers would be greatly surprised to hear that they had no control over their men. Admiral Mann seems to doubt the advisability of entrusting the command of our ships and squadrons to officers who had qualified for promotion in the engine and boiler rooms. With his contentions I do not, of course, agree, and in addition to my remarks on this subject, already made by me, in my paper, I would add that to close the Flag List to these officers must inevitably lead either to officering the steam department with officers of inferior quality, or to considerable discontent, if service in this department is made compulsory. It is quite possible, undoubtedly, to evolve a "commanding" class ignorant of departmental work. You would do this however, at the expense of the departments, which would automatically attract men of inferior ability only. It is expedient, therefore, to make the commanding ranks the reward for efficient departmental work, but no department should be excluded. I wish to thankfully acknowledge the very kind reception given to my paper. We all have the interests of the Navy at heart, and it was in the best interests of the Service, as viewed from my standpoint, that my paper was written.

The CHAIRMAN (Admiral Sir N. BOWDEN-SMITH, K.C.B.):—In bringing this interesting discussion to a conclusion, I would ask your kind indulgence while I say a few words before conveying our thanks to the lecturer for his paper. I quite understood, when the lecturer spoke of the marines, that he did not mean to disparage them or their splendid services. What he meant to say was, that whereas the marines were a necessity to us in years gone by, when our seamen were not disciplined, they are not now required for disciplinary purposes. As regards our shooting on board ship, I understand that the best shot in the Navy at present is a marine artilleryman on board the "Ocean," in China. With regard to the accountant officers, he says they are non-efficients, and he would throw them overboard. I would have thrown them overboard long ago, not because they are inefficient, but because they are unnecessary. Of course, we should retain the writers, ships' stewards, and assistants; but the accountant officers might be taken from the executive in this way. In the smaller ships the navigating officer would do the accountant work, in addition to his own, with increase of pay. In the larger ships, I would let a lieutenant do the accountant's work, and have extra pay for it, but not until he had served eight or ten years as lieutenant. There are some officers, who, after eight or ten years' service, lose their nerve, or who are, from other causes, not so fit for deck work as they were; and I believe there are many officers who would gladly take up accountant duties after ten years' service. It would be an outlet for officers who no longer felt themselves as fit as they were when younger. With regard to the so-called executive and engineer branches, which is the main question brought before us to-day, I do not myself feel disposed to go as far as the lecturer in the complete amalgamation of the two branches. I see no great objection, however, to entering all officers as cadets through the "Britannia," but after the age of 21, or when fairly embarked in their separate careers, it would be more conducive to the efficiency of the Service if the deck officers, and those told off to the engineer department, should continue to carry out those duties. All, however, would be executive officers, and the fact that an officer had served principally in the engineer department should be no absolute bar to his attaining flag rank. I am of opinion, however, that a radical change is necessary in the education of our naval officers, and that the continued presence of naval instructors on board seagoing ships should be rendered unnecessary. It is a fact that in the United States Navy, at the Naval College at Annapolis, all their cadets are brought up under one system, whatever branch of the Service they are going into, but from what I gather they do not approve of the amalgamation of the two after they have gone on board ship. I cannot believe that any officer who has spent from 12 to 15 years in the engine-room department before arriving at the rank of commander, or 17 to 20 years before arriving at the rank of captain, can be an efficient officer to command a ship or a squadron. I agree with the lecturer that with regard to ordinary seamen and boys, everyone who now enters the Service as a seaman should come into the Navy on the understanding that after the age of 19 he would be liable to serve in the stokehold whenever required to do so. It should not be a question of volunteering. At present, if men are wanted in the stokehold, volunteers have to be called for. They should go when required as a matter of course, receiving, however, additional pay whilst so employed. With regard to the scheme put before us, the age of 13 is too early for the State to take charge of the education of the cadet, and would add to our present heavy Navy Estimates. It is too early an age for competitive examination, as boys develop very differently, and if the age limit is con-

fined to 13, or even 14, we shall shut out many youths who would make good naval officers. Moreover, boys of 13 persistently catch every sort of infectious complaint that happens to be going, especially when they are crowded together on board ship or in schools, causing the loss of valuable time. I do not think it would be wise to return to that early age, but, taking into consideration the great change in the Service brought about by the use of steam and electricity, the education should be more practical, or, as my friend Commander Orpen puts it, more mechanical. A great deal of practical work could be taught young officers on board ship if they came to sea a little later, and were distributed about all over the Fleet. At present they are crowded together in large ships to enable them to have the advantage of the naval instructor, where they cannot all learn their profession. If they were more distributed they could learn their work under their own officers. An officer should serve at least three years in a sea-going ship before he should be qualified to take charge of the deck, and it is advisable that every executive officer should do navigating work for at least six months before qualifying for lieutenant. Navigating a ship is different to doing navigation on paper. According to Commander Orpen's proposals, as I understand them, an officer, except when serving on board torpedo-boats or destroyers, would not go to sea before 20 years of age. I think that is too late to go to sea. A course of instruction for young officers in destroyers on leaving the "Britannia" would be admirable; but I do not agree with his suggestion that the whole of the cleaning work of the boat should be performed by the instructional class. Doubtless the repairs and maintenance of our ships, with their various appliances, should be carried out as far as possible by our own people on board the ships, with their own resources. Since the final abolition of masts and yards, a great deal more attention has been paid to gunnery and good shooting, and to competition in coaling ship than formerly. Even when a ship is alone the quantity of coal taken on board each hour is carefully recorded; and may we not hope that in the same way there will in future be a healthy rivalry among ships in endeavouring to make good their own repairs as far as they can, not only for the sake of economy, but in order to keep them efficient when on service, or in the presence of the enemy? And if all our officers received a more practical and mechanical training they would be better fitted to insist on such repairs as were possible being duly carried out. For this reason I welcome Commander Orpen's paper, and I feel sure all present will join with me in giving him a hearty vote of thanks.

THE LANCE AS THE WEAPON OF CAVALRY.

Précis of an Article by Major-General M. VON CZERLIEU (Imp. Austro-Hungarian Army), Vienna, 1901.

The Advantages and Disadvantages of the Lance in Action.

THE question has already been threshed out in the author's work (published 1880) on "A Uniform Cavalry." He has combatted in that work the views Brix put forward in his translation of Denison's "History of Cavalry" (1879). From that time up to the present no fresh argument has been advanced in favour of the lance; and the author can find no reason for modifying the attitude taken up by him in 1880 on this question.

Alleged Advantages of the Lance.

1. The injuries caused by the lance are graver than those caused by the sword.

It must be remembered, however, that the sword can equally deal a thrusting blow while also maintaining its capacity for cutting. The sword is not limited to downward cuts, which might be met by a strong headdress or protected shoulders.

More than one instance like the following has been recorded:—

In 1812 an officer received fourteen lance wounds, and survived to figure afterwards in the distinguished service list.

A well-known German staff-surgeon has stated that lance wounds are in the highest degree humane; and has advocated a more deadly point.

2. Two weapons for close quarters are better than one.

This advantage is a doubtful one with regard to the lance, since it is counterbalanced by the added weight and by the fact that of two weapons the one might be superfluous which breaks the easier or which is rendered useless by bending, viz., the lance.

3. The lance is longer than the sword and the bayonet fixed to the rifle.

With the lance held at the centre of gravity, to ensure steadiness and accuracy in thrusting, this advantage becomes half unreal when compared to sword or bayonet, since half its length must be deducted, so that from the longest—the German of 13 feet 8 inches—only a length of 6 feet 10 inches can be considered. Now that is approximately the length of the sword held at outstretched arm; the bayonet is even longer. This can be verified by measurement. Further, the swords-

man can lean forward in the saddle more easily and carry his shoulder further to the front, in a way which is impossible for the lancer without his being thrown from the saddle after a successful thrust. The Germans seem to have found their former lance of 12 feet 6 inches of insufficient length.

4. The lance is supposed to be the real weapon of shock tactics; from which it may be concluded that it is intended in a charge to bring down one of the enemy in both of the front ranks.

But this is questionable if such a shock be considered a little more closely, and horse and horseman be regarded as living beings, endowed with nerves.

In moments of extreme danger the nerves re-act independently of the will of the individual. (The author here goes on to describe various symptoms of extreme mental tension which would impair the steadiness of hand necessary to an effective use of the lance.) Again, the horse must also be considered at such a crisis. Horses, it is well known, become unmanageable in the presence of danger. Could a man, therefore, rely on his horse so far as to be able to devote his attention to directing his lance, and feel sure all the time that the animal will not play him false by some movement of terror?

The author then quotes a personal experience that took place at the Cavalry course in 1873, and, further, another occurrence in 1888, while hunting, both of which convince him that in such moments an effective handling of the lance would be highly questionable. Again, at Königgrätz, so a friend of his relates, a Prussian dragoon rode at him, shouting "You dogs," without attempting to draw his sword, but clinging desperately to his reins. The man seems to have had a difficult horse that he could not hold with one hand. Could this not often happen to the lancer? If so, where would his lance avail him?

We must admit that the horse can at the last moment swerve to the left or right, or even backwards, or more probably jump forward. Where then will the lance points be directed?

One cannot imagine a cavalry charge, conducted by two opposing bodies of cavalry trained to shock tactics, to resemble a collision of railway trains, as if all the horses would crash together, head against head; their riders even could not achieve this. Instinctively they would make for the gaps, and in a moment their heads and necks would be pressed against the shoulders of the opposing animals, while the position of their riders would be altered according to the gaps in question. Meanwhile the lance points would be pushed this way and that by the tossing of the horses' heads both sideways and upwards. They might well miss their thrust, without perhaps even striking the next man—though this might be possible.

The sword is in this respect in a better position, since the wrist of the horseman is pliable, and by being held higher cannot be turned aside by the enemy's horse. This can be easily demonstrated. Let two ranks, armed with swords and lances respectively, in order of march approach each other at a walk, without losing touch, until they meet and the horses' heads fit into the spaces between the enemy, and let them remain there shoulder to shoulder until they can get no further. The chances in favour of lance and sword can then be accurately gauged, and—unless the experiment be prepared for by previous drill purposely to give another result—judgment must be pronounced in favour of the sword.

Data drawn from personal experience in action are, unfortunately, hard to obtain. The campaign of 1866 shows no instance of the superiority of the lance, according to the author.

Military history shows no single instance of an entire front rank being borne down by the lances of a charging enemy. It is chance only that directs the destruction of the enemy by cold steel. It is weight that tells; and even after the first moment of the charge it is a matter of pressing onwards through the mêlée. Then only will recourse be had to cold steel.

5. The lance is said to cause a great moral impression.

If this were so, then Uhlans (lancers) would inspire such awe among sword-armed cavalry as to deter the latter from attacking; but this is not the case in history. And still less so will it be in future, as swordsmen were generally content to cut only, which entailed a more open formation. But swords held for thrusting entail as close a formation as lances. The horse will accomplish more than the lance. The best directed lance thrust will not save the lancer from being ridden down.

If it will, why do officers in a charge not take a lance for a sword?

In talking of a "bristling wall of lancers" *one forgets the horse.*

6. The lance possesses a special value in an attack against infantry.

If an attack of cavalry on infantry is undertaken with any hope of success, the state of that infantry must be such as to render it a matter of indifference with what weapon the cavalry is armed. The object is to ride down and break up the infantry more than a series of isolated personal combats, since the infantry, it may be assumed, will be more numerous than the cavalry, and in single combat, besides the bayonet, would almost certainly still possess one or two cartridges. We are no longer in muzzle-loading days.

7. The lances in the rear rank render it possible to fill up gaps in the front rank.

Where the rear rank charges with lances carried upright, as in France and Italy, its only object seems to be to supply fresh lances to the front rank instead of fighting. So we prefer the sword in the rear rank.

Where the second rank charges with levelled lances, as in Germany, there the front rank is exposed to danger more than if the rear rank carried swords.

8. Lances may be used to form frames for extemporised boats for crossing rivers; also for tent poles (as in Germany and Russia).

We maintain that they could well be replaced by rods or laths.

9. According to Pelet-Narbonne's "Cavalry Service," p. 259, the lance is properly "the weapon of the offensive." Were the swords or sabres of Charles XII., Seidlitz, Nadasky, Murat less well adapted to it? It seems that the chief concern of the lance is to keep the sword at a distance. Where is the offensive there?

Disadvantages of the Lance.

1. It is a disturbing element—even if only partial—in the uniformity of the equipment, training, and use of cavalry.

2. The lance increases the horse's load, and the difficulty of balancing it. In Germany, note the carbine is slung on the near side, also the new project for a folding lance.

3. It disturbs a comfortable seat by the weight on the off stirrup; and at a canter it swings about, throwing the right foot forward.

4. It interferes with speedy mounting and dismounting. In Italy the lancer has to dismount for foot engagement by swinging his left leg over to the off-side.

5. The lance renders it almost impossible to carry the carbine slung over the shoulder. This mode of carrying the carbine is the most convenient for dismounted work, as it facilitates mounting and dismounting. German, Italian, and French troops carry the carbines in holsters. The Cossacks carry it over the right shoulders.

6. It entails more labour, and hinders the rapid education of the recruit. The lance is for the expert alone.

This paragraph would not affect the British Army.

7. It betrays the position of a troop by the glittering points and banderoles (if fixed), thus rendering surprise more difficult, and exposing the lancer himself to surprise.

8. It renders more difficult the passage of obstacles. At a jump it must be lifted out of the shoe. In thickets, woods, etc., it is in the way. The French catch hold of it in such country and trail it along the ground.

9. It impedes the management of the reins. Should a lancer bring his right hand over to assist his left, he cants the lance over his left shoulder, thus bringing the sharp lance shoe against the next horse, which is dangerous.

10. It breaks easily, and is liable to get bent; even in barracks it must be handled with some care.

11. If the horse of a swordsman comes down and hurts itself, the rider may stand ready for action, as he carries sword and carbine on him, and can immediately mount another horse. Lancers at present carry sword and carbine on the saddle. What weapon can he take if the horse has fallen on to carbine and sword? If he leaves his lance, what is the use of it; and what will he do, if he finds another horse, as a *lancer?*

12. The shortened lance, when levelled, is already shown to be even shorter than the sword carried at arm's length, hence no advantage for the charge; when in the mêlée it is still more useless than the sword.

13. The long lance is at a disadvantage in a mêlée. The French regulation thus orders lancers to open out. This can only be of advantage to the swordsmen, who will in groups of two or three attack the single lancer. The longer the lance, moreover, the more uncertain the aim.

14. The lance can only be held low down and horizontal, and is subjected to the horse's head, whereas the sword is held above it.

15. The lance is held in the middle. Hence it projects far to the rear, and might cause injury to the rear rank. The hand and arm also are far more exposed than in the case of the sword.

16. At two paces interval between ranks the rear rank must carry lances upright, as in France and Italy. Lances will only be levelled on collision with the enemy. In Austria in 1848 the Uhlans of the rear rank had to take the lance in the left hand and draw swords.

In Germany both ranks charge with levelled lances. This endangers the front rank seriously; the rear rank, again, is exposed to the pointed butts of the lances of the front rank. In Germany in

peace exercises there have been 660 accidents (nearly 11 per cent. fatal) since the universal adoption of the lance. It is clear that in the rear rank if lances are not levelled they are useless.

17. Two or three horsemen in the front rank do not level lances in rear of troop leaders; probably also not in rear of squadron, regiment leaders, etc. We see, therefore, that in some Armies the whole of the rear rank and some of the front rank do not use the lance at all.

18. After the shock and in riding down the enemy quickness in turning is of great advantage. Lances will be more in the way than swords.

19. In dismounted fighting the lance causes all sorts of difficulties.

Quickness of mounting and dismounting is impaired, etc. In Germany every other man holds a lance as well as a horse, and carries one in either hand, having one lance bucket on each stirrup. The Germans have found the French and Italian method of fastening the lance to the empty saddle impracticable.

If the horses are tethered the lances are laid down or gathered into pyramids, which wastes time in rapid movements.

20. On service, patrols will have to seek high cover to hide themselves, when on the move. So observing patrols may find it better to leave their lances behind; while for scouting it is always best to have firearms in hand. N.C.O.'s who have on such occasions to use a map are severely handicapped according to the German regulations.

21. In swimming streams, crossing marshes—in all places where man and horse are separated—the lance becomes a burden. No regulation has yet laid down how a man is to swim with a lance about him.

22. In case of a surprise of a column of lancers by swordsmen, the lancers, in wheeling to form front, run grave danger of being injured by their comrades' lances in the confusion.

23. At a distance of two paces between ranks there is already considerable difficulty in levelling lances. What would be the result in column? This formation may be still necessary, especially where lancers might find themselves caught in a defile.

24. In the mêlée small bodies of lancers cannot be quickly handled, as they impede each other, and at a rapid pace they endanger their comrades. In Germany reserve squadrons are allowed to brigades, but not to regiments. Why?

25. In various evolutions at a quick pace, carrying lances, not to mention wielding them, becomes a serious matter.

Conclusions.

The friends of the lance are pursuing a phantom, and are deceived by appearances. The lance can be opposed successfully; Charles XII. found out how to deal with the lances of his innumerable enemy.

It is largely a matter of nervousness; one man may feel it more than another. But he who is nervous before a lance will be equally so if he be armed with one. It is the picture of that "serried rank of steely points" that appals—and we can show that this need not be so. In Germany every attempt is made to keep the ranks closed as far as possible. To meet lancers successfully they must be opposed by troops of equal value. The inferior men will always come off worse. The object in view is to force gaps in the opposing line of lancers for the swordsmen.

How to Oppose the Lance.

1. Increased efficiency in cavalry swordsmanship. The same importance must be attached to this as is done in Germany to the use of the lance, where the training is extremely serious and practical. In past ages the lancers were always highly trained men. The lance is only to be feared in the hands of an expert.

2. The swordsman must be taught to grip well with the lower part of the leg, to stretch well forward with the right shoulder so as to offer a smaller mark for the lance, to keep his eyes open, watch the opposing lance, and press it outwards right or left by holding the sword a little lower than in the act of pointing at the enemy. The sword to be held a little to the right above the horse's neck, the blade inclined forwards, edge out. The lance can then be effectually turned aside in delivering the thrust. The usual direction of striking the lance upwards is not practicable in shock tactics. This position is also the best against swords.

3. In "Cavalry Service," p. 265 (Pelet-Narbonne), it is stated that the lancer requires a certain room to use his weapon to best advantage; wedged up between the enemy he is powerless. So close quarters should be the aim of the swordsman's training; it should be instilled into him as an article of belief that the more he attacks with vigour the better his chance of success.

4. The lancers must, on approaching, and before deploying, be harassed by carbine and revolver; small patrols sent boldly forward to fire at a range at which they can be sure of doing execution.

5. Simultaneously to the frontal attack, flank and rear attacks, even by small detachments, must be arranged. The main body may, over favourable ground, be withdrawn, and by a feigned retreat, when the flank attacks make themselves felt, meet the lances by a suitable manœuvre.

6. Before the shock, place two bold horsemen to set upon each leader of the opposing charge. These should carry revolvers or automatic pistols. These weapons, indeed, would seem to be less dangerous to one's own side than the long two-pointed lance.

In France, Italy, and Austria, the leading officers fall back in line with the troop leaders. In Germany and Russia they remain out.

7. The lancers will often betray their approach by their lances. This is clear gain in preparing to receive them.

8. As many lancers go into action carrying lances upright, instruction should be given the swordsmen to strike at the wrist and arm of the lancer.

9. The lancers being at a disadvantage in dismounted actions, every effort must be made to draw them into such actions, and then, if possible, charge them.

10. A more effective arming of cavalry. Carbines and horse batteries will keep pace with the improvements in the armament of the Army.

Experiments are now going on with automatic pistols. The revolver has already proved its value. In France an automatic sword-pistol has been tried. It would be curious if cavalry, which, so far professes to despise the revolver, saw itself forced to accept such a weapon.

No drill-book mentions two possible cases:—

a. Where a cavalryman at close quarters is unhorsed.

b. When fighting dismounted he is attacked by cavalry as such.

In 1864, at Okolona, the mounted Secessionists, under Forrest, repulsed three successive cavalry attacks with their carbines, having previously dismounted; a fourth and far more determined attack was defeated entirely by revolver fire. Again, in a like manner at Tishimongo Creek, Forrest defeated an infantry attack.

The author here advocates a lighter sword, and comments unfavourably on the Maxim gun as a cavalry weapon—reasons:—

a. It does not scatter its fire sufficiently.

b. Delicacy of mechanism.

c. The water jacket.

He, however, praises the horsed mitrailleuse, and suggests some improvements for it. He suggests the adoption of four such weapons to a cavalry brigade: it would avoid dismounting for long-range shooting, and allows the men to save ammunition.

He comments on the results obtained by Maxims in South Africa, and declares them to have failed to achieve what was expected of them.

He discusses mitrailleuses generally, and illustrates his views with a reference to South Africa.

11. In the front rank must be placed the heaviest and strongest horses, with the strongest and coolest riders. The rear rank men must, however, support their front rank as far as they possibly can in the mêlée.

12. After an attack, it should be required from every horseman that his sword should be bloodstained, and this should be ascertained before swords are put away. Many a young soldier might, in the turmoil of the mêlée, forget to use his weapon.

13. All officers and men riding in front of the line must, on the charge, fall in with the line, either into blank files for troop leaders, etc., or in the spaces between squadrons, etc., for higher officers.

14. Swordsmen must always attack lancers on rising or sloping ground, in woods, thickets, and orchards; they must engage them in defiles and envelop them at night, especially when they are in villages; they must draw them into artillery and infantry fire. Whenever the ground or weather is unfavourable, the lancers should be attacked. Swordsmen are not limited to attacking lancers on level ground only. If they do not advance against them when the latter are not in a position to keep a solid formation with a view to a charge, their (the swordsmen's) best chance is lost.

15. Should nothing avail to destroy the fear of the lance, should the revolver and automatic pistol be discarded, nothing remains but to arm the swordsmen with the cuirass; the lower half of the body is guarded by the equipment. Should the lance become general it is possible the cuirass may come into use again. When, some years ago, the re-introduction of the lance was contemplated, our War Office (Austrian) was charged with an enquiry into the value of that weapon in war. It could not be proved in any single case that a success gained by lancers could be attributed exclusively to that weapon. The Prussian Uhlans in 1866, for instance, were mounted on heavy powerful horses. It was the shock that told.

Briefly.—In early middle ages the lance is the weapon of offence—then came thick plate armour, and the sword became more important.

On the adoption of firearms the lance and armour disappeared; towards the end of the eighteenth century, the primitive pistols, etc., have driven out the lance and armour. Yet to-day, in the face of incomparably better firearms, there is a craze for the introduction of a weapon discarded two centuries ago.

Summing Up.—The successes of Charles XII. were won by the splendid qualities of the Swedish cavalry against overwhelming numbers of irregular lancers. These qualities are the secrets of his successes.

In 1889, when the lance was brought into the German Service, the French *Revue de Cavalerie* supported its adoption in France simply on the ground of following others. One must always bear in mind that the chief argument for the lance is the *moral impression* it arouses, and that this is obtained only by the weapons of the front rank, and that its great drawbacks exist chiefly in its adoption by the rear rank; also that the remaining drawbacks are, to a certain extent, avoided by arming only the front rank with them. But there is no argument for arming only lancer regiments with the lance. It is either all or nothing.

Minor Difficulties.

Difference in equipment would entail a difference in use, and consequently a difference in training. If all regiments are not equally available for the task in hand it must become a source of weakness; it is not so much a question of numbers, but of efficiency all round.

The carrying of the carbine over the shoulder is to be preferred. The Cossacks carry the carbine over the right shoulder; the sword is fastened to the saddle, as in Germany, France, Italy, and England.

The N.C.O.'s of the front rank ought to be armed with lances; those of the rear rank with carbines. The rear rank if armed with magazines carbines, should in all but the most serious situations suffice. Thus there arises the question of how to distribute the men. Is it to be the best riders in front; the best shots in rear?

Then there is the question of material. The German lance of 13 feet 6 inches, of tubular steel is strong and light; but it can easily be damaged, by being trodden on even. This is not easy to avoid if the lance is laid down. A lance also should allow of a swinging blow being dealt without its bending.

Noteworthy Opinions.

Seidlitz is quoted in conclusion. In the charge it is a matter of indifference what weapon the soldier carries. The chief thing is that *he should be well mounted;* and he should bear in mind the unshakeable resolution to ride down his enemy with his horse's breast. In the mêlée the sword and mace are the only weapons practicable."

This riding-down can also be effected in open fighting, especially with well-trained horses and where an enemy can be charged obliquely.

The freedom of movement of the swordsman in the mêlée is not restricted by his weapon; and this should be used incessantly in single combat against lancers. A passive attitude leads to the swordsman's undoing. The success of the lance is due to poor swordsmanship.

In Russia the question of the lance has again been brought forward. General Dochturov stated many years back, when the question was first raised: "The arming of the cavalry for the charge is of little

value. A badly trained body of poor armed horsemen will always be inferior to an unarmed but bold and well-mounted enemy."

Colonel de Witte declares "that changes, and many of them, may come about in the arming of cavalry; and we need not be at all surprised that if the whole Russian cavalry were to adopt the lance, the Germans should discard it immediately."

Lastly, "Bleibtreu," in No. 21 of *Danzer's Armee Zeitung*, writes under the title "The Lance as Weapon":—

"The Garde Chevaulegers received lances only after Wagram. Napoleon was doubtless influenced in this direction by the Polish element. Their number was small; also the Dutch "red" lancers and the troops of the Grand Duchy of Berg had set the example. Originally Napoleon gave one lancer regiment to each division of Cuirassiers, to do the scouting. But this was not always carried out, as the Polish regiments seem to have kept together. Nowhere do lancers seem to have achieved a decisive success. Thrice the renowned Polish lancers were routed by the Prussian cavalry. Once only, at Waterloo, did they succeed—where a lancer regiment broke up Ponsonby's exhausted brigade of dragoons, and another Vandeleur's Hussars. Even then the result was due to a flank attack—as it has always been when lancers have been successful. Individual instances can be adduced on either side of the question. If the swordsmen penetrate the line of lancers, the latter are lost. On the other hand, the lance has certain advantages—in flank attacks, in shock tactics against a clumsy enemy, while in the mêlée against a determined onslaught it is often at a disadvantage. It is not the weapon, but the quality of the men and skilful leadership that win the cavalry battle."

WHAT HAS THE BOER WAR TO TEACH US, AS REGARDS INFANTRY ATTACK?

A lecture delivered before the Military Society of Berlin, 5th March, 1902, by Lieut.-Colonel von LINDENAU, of the German General Staff.

PREFACE.

THE literature of the Boer war is already extremely voluminous. A stately row of volumes in different languages fills the military libraries of the world. Appendix I. shows those of which I have made special use, but notwithstanding the mass of writings, it is still a matter of great difficulty to arrive at a correct conclusion concerning particular engagements. The English reports leave many controversies undecided, and give as a rule few details. Some very good accounts have, however, been supplied by British officers, both gratuitously and by request, and these have cleared up some of the doubtful points.

The best account given me was that by Captain Freiherr von Lüttwitz, of the German General Staff, who took part in the Boer war as German Military Attaché on the English side. I owe him my best thanks.

The accounts from the Boer side are few in number, so that I was all the more pleased to have placed at my disposal the diary of a German who took part in the war, fighting on the Boer side, and who is again serving in our ranks. To the latter I also owe my best thanks, as well as to the author of "Military Observations on the South African War,"[1] who also fought on the Boer side, and supplied me with information I asked for on various points.

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1. Introduction.

What lessons do we derive from the Boer war for our infantry attack?

At first sight this would seem under the circumstances a vain question, for what can a European Army which has to fight on European soil learn from a war fought under the hot sun of South Africa, and under such peculiar conditions?

2. Terrain and Climate.

Where can we find in Europe a country consisting of desert tracks miles in length, and marked by the absence of anything in the way of cover from view, such as trees and bushes, or human dwelling places? There lies over this broad expanse of Africa an atmosphere of astonishing purity and clearness. This very atmosphere makes the

[1] Translated in the *U.S. Journal* of February, 1902, *et seq.*

peculiar nature of South Africa all the more apparent, and renders it very difficult for the European accustomed to countries presenting many different forms of aspect to fix his position. Wherefore it is very easy to lose one's way.

It is only very gradually that the eye becomes accustomed to quickly identifying the changes in the surface of the country. All bright colours are more easily distinguishable there than at home. The question of dress therefore is one requiring careful consideration. The white helmets of the British were of little practical use in this respect, however good protection they may have otherwise given against the heat of the sun. The temperature continually rises to 30° Réaumur (100° Fahrenheit), and often it becomes so unbearable that troops can only finish their marches by night or in the early morning or evening. The difference in the temperature of night and day is considerable. In the dry season of the year, which lasts from April to October, the nights following the hot days are often marked by several degrees of frost.

The wilderness of ever-recurring mountains is covered by huge boulders. The ascent of these is only accomplished after considerable trouble. A perpendicular wall of rock often encloses the top, and here trees are as scarce as water. The kopjes, which played such an important part in the various engagements, are so regular in form that they can often be mistaken for fortifications made by hand. They even had the advantage of the latter, in that the irregular, dented character of the top gave the marksman excellent cover whilst firing. If we look at the picture of Spion Kop and the heights of Colenso, as drawn by Captain von Lüttwitz, and then, to make the impression all the more realistic, seek out ground formations in our own country similar to those of South Africa—such as for instance the "Finie," in the Province of Hanover, by the banks of the Leine; that is to say, in the neighbourhood of Elze.

Their value was tested in the Imperial Manœuvres of 1889 by the Xth Army Corps, under the orders of His Majesty the Emperor, by whom they were defended, and by the VIIth Army Corps, under command of General von Albedyll, by whom they were attacked. Only we must imagine the east wood which flanks the "Finie" in the direction of Wülfingn as wholly absent, for this enabled the VIIth Corps to make an enveloping movement under cover from view. It is only by making a comparison such as this that we can arrive at a correct understanding of the great difficulties of the attack as experienced by the British in South Africa.

3. Strengthening of the Natural Features of the Ground.

The positions of the Boers were nearly always strengthened by means of irregular earthworks, deep rifle pits, or stones heaped up together. It should be remarked in passing that stone-splinters do not cause frequent and dangerous wounds, as is commonly supposed. Stones were employed by the Boers against every kind of fire, and made excellent cover. They preferred them to sandbags on the top of their earthworks.

Their fortified posts were nearly always skilfully adapted to the ground. They still further strengthened those positions which were already strong by nature, and thus made the task of the attackers all the more difficult.

4. Numbers Engaged.

The broad plains of rolling veldt common to South Africa were in striking contrast to the numbers employed on both sides. If one were to draw a line from Lorenço Marques at Delagoa Bay, *viâ* Pretoria and Mafeking round to Cape Town, bounding the great theatre of war on the north and west, whose shores on the east and south are washed by the sea, the area contained would amount to about 800,000 square kilometres; that is to say, a tract of country nearly as large as Germany and Italy together. In this vast territory attackers and defenders split up their forces completely. The maximum of the Boer forces was in round numbers 50,000, or the equivalent of three German divisions on war strength. The British forces gradually reached the strength of about five German army corps; but the protection of their long lines of communication, and the great dispersion of their forces which was so prevalent until the arrival of Lord Roberts, resulted in only small fractions of the total strength of units being available for individual battles. Accordingly, for the three decisive battles chosen in these notes as examples for the attack, the forces at hand were as follows:—

At Magersfontein, 12,000 men (a weak division), against 6,000 (a brigade).

At Colenso, 15,600 men (a division) against at the most 3,000 (a regiment).

At Spion Kop, 20,000 men (a strong division), as against at the most 4,000 (a weak brigade).

5. Influence of Land, Climate, and Numbers.

In the peculiar circumstances depicted, which existed with regard to numbers, country, and climate, the fighting in South Africa in many respects assumed a different character to that which we would have expected from Armies in Europe, where huge masses of troops will when in movement, endeavour to concentrate at particular points for decisive action. The course of these operations will therefore hardly show the local tying down of forces at particular places, which was so peculiar a feature of the Boer war. But in spite of this, we must unconditionally cast aside the objections of all who, in idle confidence, think that it is impossible to draw from this war useful lessons.

Nothing can alter the fact *that in this war for the first time weapons in every respect more powerful were used, owing to the strides made in technical knowledge in the last century.* Nothing can upset the contention that the defender, great as was his inferiority in numbers, nearly always was successful in the early stage of the war in beating back his opponent, greatly superior in numbers as he was. A German who took part in the war, and who is back again in our ranks, wrote in his diary on the field of battle, "One can see with how few men a mountain region can be held when they are well equipped and trained to shoot. Inferior forces are with difficulty dislodged by superior numbers, as long as their determination to resist is unbroken." By many the opinion was freely expressed that the defence was now the stronger form of combat. This was owing not so much to the position which the defender took up as to his weapons and their increased effect.

6. Arms.

To be perfectly clear on this point a short consideration of the weapons employed by the opponents on both sides is necessary. The rifle used by the majority of the Boers was the improved Mauser 7-mm. (·275-inch) in calibre, whilst that of the British was the Lee-Enfield, with a calibre of 7·7-mm. (·303-inch). The rifle of the Boers was an extremely effective one of small calibre, which was first turned out in the year 1895, whilst the Lee-Enfield dates from 1888, being first known as the Lee-Metford, and only in 1895 being altered to its present form. The Boer rifle was on the clip system. The Enfield had a detachable magazine holding ten cartridges—a defect in the latter was that it could only be filled by inserting single cartridges one after the other after the original ten were expended, or by the substitution of a fresh magazine. The Boer rifle was accordingly far superior to that of the British.

A comparison of the field guns used reveals the following:—The British horse and field batteries had guns of 7·6-cm. calibre (3-inch). The former used 15-pounders, the latter 12-pounders, both constructed between the years 1884-95. Although both patterns had a device for the reduction of recoil, neither was a quick-firer. The British also had howitzer batteries of 12·7-cm. calibre (5-inch), 1896 pattern, which fired Lyddite shells. The effect of these was, according to Boer accounts, not very great against riflemen lying down, and was frequently nil, except to occasionally cause wounds of a not dangerous nature. The English shrapnels appear also to have had little effect; they often burst in such a manner that the shell remained whole and the contents remained inside. The cone of dispersion was extraordinarily small and the amount of front covered only 4 or 5 metres. They, therefore, did little damage against the thin firing lines of the Boers. Even the bullets with which the shrapnel were filled seldom caused serious wounds at 100 paces from where the shell burst.

On the Boer side, the bulk of the artillery consisted chiefly of Q.F. guns. Besides weapons of a more ancient pattern, they had, at the beginning of the war, 69 modern field guns, namely:—

Eight 7·5-cm. (3-inch) Q.F. guns, constructed by Krupp in 1899.

Sixteen 7·5-cm. (3-inch) Q.F. guns, Schneider-Creusot, constructed by Krupp in 1898.

Five 7·5-cm. (3-inch) Q.F. guns, Maxim-Nordenfeldt, constructed by Krupp in 1897.

Twenty-four 3·7-cm. (1·45-inch) automatic Maxim-Nordenfeldt.

Four 3·7-cm. (1·45-inch) Q.F. mountain guns, by Krupp.

Eight 12-cm. (4·7-inch) field howitzers (4 by Krupp, 4 by Schneider-Creusot).

Four 15·5-cm (6-inch) position guns by Schneider-Creusot.

Of these guns the Schneider-Creusots were ballistically the best. They were, however, very delicate in mechanism. Their glycerine brakes for the reduction of recoil frequently jammed. Next to the Krupps, which were distinguished for their excellent shooting, the Maxim-Nordenfeldt proved to be extremely effective. Single guns of these have often fought with success against whole batteries at ranges of 3,000 metres. They were, moreover, the only guns which had shields, like those which the French adopted in their 1897 model. The advantage of such shields, which afford complete protection against

shrapnel and rifle fire has been clearly demonstrated by the Boer war. The disadvantages of such shields, which add to the weight of the system by about a hundredweight, and, under certain circumstances, increase the visibility of the weapon, have to be taken into account. The latter disadvantage in the course of the war proved to be of little importance. From the above it may be gathered that the Boer artillery, though inferior in point of numbers to the British, was nevertheless far more modern, but the preponderance in numbers of the British was such that, taken on the whole, their artillery overpowered that of the Boers. For this reason the Boers avoided the opening artillery duel, withdrawing their guns behind cover, and as a rule never replied to the British artillery fire which preceded the infantry attack. The Boers generally opened fire as soon as the British infantry arrived within specially effective ranges.

The attacker who does not wish to deprive himself of a great chance in the commencement must at least have weapons which are equal to those of the defender. If his rifle is inferior to that of the defender his field gun must be at least superior, *otherwise the success of the attack will be very doubtful.* Even our infantry, highly trained as it was in 1870, only succeeded in making its way with the needle-gun against the Chassepot, because our superior field guns completely overpowered those of the French.

When one remembers that the British gun-making industry is a highly developed one, and was in a flourishing condition, it was natural to suppose that their soldiers would be equipped with rifles and guns which were superior in themselves to those of their opponents. This was all the more requisite, inasmuch as they had nearly always to assume the offensive, which, as we have said, proved very difficult. Accordingly, England found at the beginning of the war the truth of the old maxim that weapons which are not modern become the most expensive that can be used.

7. The Effect of Modern Firearms.

And England's Army had to learn yet another old truth on the battle-field, which had been forgotten in the changes of time. We can opportunely repeat it, so that we may not lose its application. Under the influence of experience, Captain von Lüttwitz, of the German General Staff, who was with the British, grasped it, and thus wrote from the theatre of war:—*Tactical formations are governed by fire effect, modern weapons govern modern formations.* Because England's old regiments did not understand at the beginning how to solve this problem of new formations, and did not recognise the fundamental principles which promised success even against modern firearms, they at first failed in all their attacks, and their failure was the more readily brought about as they began their attacks under conditions which, in German opinion, did not seem to promise success. The defender had the advantage of the ground; that could not be altered. The advantage which the superiority of weapons could have given to the attacker was overlooked. Superiority in numbers was, indeed, assured; but this could have been turned to far greater use than was actually done. Everything accordingly turned on the skilful use of forces; but here again was failure. The British Army, trained for years past in savage warfare, and over-confident, experienced a very unpleasant surprise when first exposed to the effect of modern firearms in South Africa. But this effect of modern firearms would

have been equally a surprise to the troops of other Armies. *In face of the conjoint rapid fire from the small-bore magazine rifle, and the quick-firing field gun, no army should have attempted the attack over the open smokeless battle-field.*

The maxim that "Facts destroy theory at one blow" was therefore again pressed home. New ideas could be evolved, which could only be tested on the actual battle-field. Mishaps such as the British met with in the earlier battles of the war, had unfortunately been already experienced by our own Armies in former times. When the Prussian battalions advanced, on the 14th October, 1806, to the attack of Vierzehnheiligen and Hassenhausen, and had already surrounded both places in a semi-circular formation, their attack failed, to the surprise of everyone, under the destructive fire of the swarms of French sharpshooters, who handled their weapons more skilfully and made the best use of ground before even the French columns had come in contact with the Prussian lines.

And it was only because the German infantry succeeded on its own initiative in throwing overboard the old attack formations during the campaign of 1870, formations which had cost it some of its best regiments in the early battles, that it was spared further sad experiences in the subsequent course of the war. But we all agree that the price at which our infantry bought their experiences was a very costly one. It must be admitted that those who maintained these losses should have been avoided, had due regard been paid to the experience gained by the troops in the battles of 1866, were justified in their criticisms. These lessons had simply been ignored.

In the first rank of these one should mention the well-known pamphlet of Captain May, entitled "Tactical Reminiscences of 1866." These facts must be alluded to here, to show clearly how it is the impressions formed on the actual battle-field, which produce changes in tactics. Certainly the way may be paved by discussion, but the solution is only arrived at in battle itself. In this connection it is not uninteresting to recall the fact that it was between the death of the great King and the defeat of 1806, that so much varied literature on the training and employment of troops appeared in Prussia. The absolute defects in the old form of fighting had been made quite clear, and had sometimes been published without any reserve.

There appeared, in the year 1805, a book by Heinrich Dietrich v. Bülow, entitled "Modern Tactics," in which it was stated: *The battles of the future will be decided by the fire of skirmishers.* Bülow also declares that the use of ground by skirmishers is extremely important, and even hints that creeping on the stomach should be carefully practised. "How much blood would have been spared if the Prussian Grenadiers and Musketeers had only ventured to lie down when under the enemy's fire!" says General v. der Goltz, speaking of Rossbach and Jena. But still more significant must it appear that the advice of Frederick the Great, in his Military Testament, could have been altogether forgotten: "In the future," says the great King, "I would leave the preliminary attack to the free battalions (Freibataillonen).[1] I would cause them to advance in a scattered

[1] The "Freibataillonen" were a kind of Volunteer Militia, recruited in the country districts; their discipline was not so strict as the Regulars, but they contained in their ranks many foresters, huntsmen, etc., who presumably were more or less skilled marksmen.

formation skirmishing, in order to draw the fire of the enemy on themselves and so that the troops in close formation can the better advance to the assault." It naturally occurs to one to think, when hearing this royal opinion, how absolutely different would the result of the battles of 1806 have been if his counsel had been followed!

It was only misfortune that brought the new formations of 1813 to the test. In contradistinction to this, the happy course of the war of 1866 caused the lessons which had been learnt, with regard to the employment of infantry to be forgotten and led to the costly sacrifices of 1870 already mentioned. Even when the splendid troops, in the course of the war of 1870 had shaken themselves free of the old and dead formations, and made the swarms of riflemen the principal fighting formation for infantry, 17 years in the feeling of victory passed by, and it was not until 1st September, 1888, regulations confirming the lessons learned in the battle-field itself were issued to the infantry.

8. The British and German Regulations.

Nearly all the Armies of the world have taken advantage of our regulations of 1888 for the drawing up of their own fighting instructions, because they knew well that these regulations formed the thesis of original experience in war, direct from the domain of actual facts, and agreed upon by the best experts after prolonged discussion. Even the English Army had utilised many of our principles in its drill book of 1896. Especially do we find it in accord with our instructions on the attack contained in Part II., 82, of our own regulations. The guiding principle, *the obtaining superiority of fire over the defence*, is clearly laid down in section 113, both for infantry and artillery, and we find again, in paragraph 4 of the foregoing section, that the advance of the infantry should not take place before the artillery of the attack has gained a superiority of fire over that of the defence—(see our regulations, 82, 4). The principle also laid down by us in Part I., sect. 224, that a definite object of attack or specific duty should be allotted to each body of troops appears in section 112 of the British Infantry Drill. Equally clear, as with us, were the instructions contained in 110, 114, 115, and 124, that a frontal attack must be combined with an enveloping or flank attack.

It is laid down in sections 111 and 112 that the attacking force must be carefully distributed, especially in the depth of the formation, which should be carried out in three lines (see our regulations, II. 64). An essential difference, however, existed between the two regulations with regard to the duties of the three lines, which may, for short, be called the leading, assaulting, and reserve lines, respectively. Whilst in the German regulations it is provided that the first two should very soon work together, and that finally the reserve should be brought up for the decisive moment; the British regulations leave the attainment of superiority of fire entirely to the first or leading line; and it is not till the commencement of the assault that the second line comes into action.

Captain Schulz, of the Bavarian Regiment No. 14, in his paper on the tactical training of British Infantry (see the "Jahrbücher für Armee und Marine"), draws attention to the fact that the way in which the attack of the two following lines is carried out in peace-time caused the action of the leading line to be continuously curtailed, and made

the heavy onslaught of the second line chiefly an advance of drums, trumpets, and hurrahs.

Still more questionable was the use made of the third line, which, in a defensive position, awaited the outcome of the fight in order to cover the retreat or take up the pursuit. The manner of employing fire was very different in the two regulations. The British preferred the volley, the German relied on the well-aimed individual fire of the marksmen. The small stress which was laid on the training of the individual men on the range was due to this view of the British, although the number of rounds allotted to each man in the year was amply sufficient for his proper training in marksmanship.

With regard to the deployment of the shooting line, it was laid down in the British regulations that the interval between each man should be stated. A shooting line in single ranks arm to arm was contemplated in section 48. Close firing lines were nearly always made use of in the beginning of the war. It was only on the arrival of Lord Roberts in the country that more open formations were adopted.

Finally, differences existed between the two regulations with respect to the opening of fire, which were afterwards to prove fateful on the South African battle-fields. Whilst sections I. 132 and 133 of our drill regulations, taken in conjunction with section 160 of our musketry instructions, define the limits of the short, medium, and distant ranges, short ranges being reckoned up to 600 metres and medium up to 1,000 metres, the British drew the line between short and medium ranges at 500, that is to say, about 460 metres. It therefore placed this range, in spite of the increased effect of firearms, 140 metres nearer the enemy. It is only under quite exceptional circumstances that firing ought to be opened at ranges over 800 yards (735 metres); accordingly, whereas medium ranges, according to British ideas, commenced 265 metres after ours, it was clear that the fire of British infantry opened at a later stage in the fight than would have been the case with us.

It was laid down in our musketry regulations, drawn up by Major-General von Holbach at the end of the nineties, in the clearest manner and the most convincing form, that the fire opened by us at medium ranges was in no sense a preliminary to the development of an attack, but a serious and important part of the attack itself.

This required most careful training of officers and men in the employment of fire at medium ranges, when carrying out the attack. Five per cent. of hits of the ammunition expended would be expected in the first five minutes from marksmen against heads and shoulders at medium ranges, *i.e.*, from 600 to 1,000 metres, which, in the case of firing lines of equal strength, should entail a loss to the enemy of 25 to 35 per cent. This means, taking a look at the percentage of losses arrived at in the examples, greater losses than the British suffered at Magersfontein, Colenso, or Spion Kop. There can, therefore, be no doubt that individual fire is the best means of making headway at medium ranges, *i.e.*, from 1,000 to 600 metres. The old principle, in itself correct, that success depended not so much on early but decisive fire, became therefore exaggerated and misunderstood by all those who, considering the increased effect of modern firearms, which was quite recognised at the end of the century even before the Boer war, were always saying: "We must advance without firing a shot until we approach to ranges of 600

metres." Even before this, the effective employment of the rifle at ranges of 1,000 metres has brought about the disintegration of the enemy's fire. Of course, as the enemy's position is approached, endeavours to make the fire more effective should be made; but here the defender may prove to be the better, especially if he is able to surprise the attacking ranks with his magazine fire, as the Boers did the British in South Africa.

Inasmuch, therefore, as the British regulations differed from ours in very important particulars, it is, in my opinion, only right to admit that German method of attack exercises, as seen by the British on our drill grounds, may have had some influence on their too hurried method of attack, which caused them to advance on their opponents without sufficient preparation by infantry fire up to short ranges. The latitude which was allowed by our regulations had shown the British officers who came to us pictures of our attacks, which misled them, and they, misunderstanding the principles of our regulations on the infantry attack, drew erroneous conclusions, such as only could be justified under most exceptional circumstances.

Quickness of movement and deployment had undoubtedly been very much to the fore on account of the level nature of our parade grounds, and had made a lasting impression on the eye of the foreign critic. The great rushes which our riflemen made, which, according to section I. 127, were to be seldom more than 80 metres in distance, but were in practice never less, and the great extent of frontage in which these rushes were made—without there being any detailed regulations on this latter—often battalions, seldom under two companies, appeared to all, who considered the solution of the attack problem to be celerity of movement, as especially efficacious. If the opinion has sometimes gained ground that the British have since maintained without cause that their defeats were due to having adopted our plan of attack, in order to make excuses for this defeat and as an answer to the bitter attacks of the German press, I for one don't believe it. From all I have been able to find out in this matter, I am convinced that these opinions were the result of scrupulous conviction.

It must here be mentioned that "The Military Observations on the War in South Africa," which aroused a well-merited discussion, confirmed in the most absolute manner the opinions which had reached us as to the great similarity between the German and British form of attack. In one passage of the "Observations" we read the British infantry generally deployed under the fire of its own artillery in formations very similar to those observed at our "peace manœuvres." Another passage runs: "The plan was in principle much the same as ours." There is no question therefore about similarities.

To make this clear, and thereby to examine the use the English made of their own regulations, it seems to me that the three examples of the battles of Magersfontein, Colenso, and Spion Kop are especially instructive. Their consideration will thus prove all the more practical, because it was from these very battles that the British learned those lessons which led to such efficient tactical formations after Lord Roberts had assumed the command.

(To be continued.)

CONSCRIPTION OR COMPULSORY VOLUNTEERING.

By Captain A. T. MOORE, R.E.

The Danger of Invasion.

BARON EDELSHEIM'S scheme for the invasion of England by Germany has not received the attention and authoritative discussion it merits; yet it is only one of the many signs, that German military authorities consider the invasion of this country a quite feasible undertaking, if they can only obtain temporary command of the North Sea, and one which would certainly be attempted, if it were desired to bring this country to its knees. Germans recognise now that the United States, with their powerful Navy, will never consent to food being considered contraband of war, and this action by the United States would frustrate any idea of starving us out.

It is obvious that, should the Germans be able at any time to gain command of the North Sea, an invasion would be quite possible under the circumstances premised by him. On the other hand, it is exceedingly problematical how far such an invading force would be able to penetrate into the interior.

An invasion must therefore be rendered unfeasible, which means that the mere intention or inception of any such act on the part of our powerful Continental neighbours must be prevented. It can only be prevented by the possession of a large Army for home defence. By no possible means can an Army of Regulars, serving voluntarily, of the required numbers, be raised or maintained. The question, therefore, resolves itself into the very simple but incalculably important one of "Can conscription in the United Kingdom be avoided; and if so, how?"

Defence of the Empire.

Before discussing this, we must consider some undeniable axioms. England (I use the word advisedly for Greater Britain) is a world-wide Empire.

The first line of defence for the Empire is a strong Navy with British-owned cables connecting all the parts of the Empire. The Navy must be so distributed in peace-time and be of such strength as to be able to overcome a *sudden* combination between *any possible enemies in any part of the globe.*

But all the Colonies should contribute to the Imperial Navy by *matériel* or in *specie pro ratâ* of their seaborne trade receiving in return free trade within the Empire.

The second line of defence of the Empire consists of the portions of the British Regular Army stationed in India and the Colonies, aided in each Colony by the local Colonial forces of that Colony.

The question of Colonial forces does not come within the scope of this paper; but it is obvious that all the Colonial forces must be organised on an Imperial standard; that they must be properly armed, equipped and trained; that they must be self-contained, *i.e.*, must possess all the accessories, engineers, medical corps, transport, commissariat, and ordnance, as well as the three combatant arms; and that a portion of these Colonial forces must be Imperial and available for service in any portion of the Empire in times of emergency. The strength of the forces in each Colony should be proportionate to the white population and to the seaborne trade. An interchange of units between the Regular Army at home and the Colonial forces would tend to the efficiency of both; each would learn from the other; and such intercourse would increase the inflow of recruits as well as popularise the idea of Imperial unity. But each Colony must work out its own salvation under Imperial guidance as an integral part of the Empire; and after the extraordinary loyalty and imperialism recently displayed by the Colonies in the case of the South African War, it can safely be assumed that they would take up their share of the Imperial burden if encouraged by the Imperial Government.

The Empire is like an octopus: lopping off one arm will not destroy the creature, but it will cause its death through loss of vitality.

Defence of Great Britain, the Citadel.

Great Britain is the citadel of the Empire, and London is the keep; these must be defended at all hazards.

The first line of defence of Great Britain is again a strong Navy. The fleets in reserve must be strong enough and ready enough to protect the citadel without assistance from commerce-protecting and colony-protecting fleets, whose proper duties lie elsewhere.

The second line of defence of Great Britain is the Regular Army at home and the manhood of the nation.

The Necessity for an All-Powerful Navy.

Thus it is seen that in every case the Navy is our first consideration. The latest standard of strength was one of 3 to 2 compared with any *probable* combination between any *two rivals*. Recent events have shown that the standard of comparison should be with any *possible* combination of any *three rivals*.

But the question we have to consider in view of the German menace is the procedure to be adopted to protect the citadel in case of a temporary inability of the Navy to perform its whole task; this leads us to the consideration of the land forces of Great Britain.

The Land Forces of Great Britain—The Regular Army as it is.

The British land forces consist of:—

a. The Regular Army.
b. The Auxiliary Forces.

The strength of the Regular Army is at present in normal times approximately 8 army corps.

Of these 8 army corps the equivalent of 2 are in the Reserves, about 3 are in India and the Colonies, and about 3 are at home. But those at home consist largely of young and untrained men; and, taken as a whole, the Army is considerably deficient in artillery and cavalry, and very deficient in engineers, medical corps, transport, and commissariat.

The purposes for which the Regular Army is required are said to be:—

a. To furnish 3 army corps for home defence.
b. To furnish 2 army corps for offence.
c. To keep small bodies ready to mobilise rapidly for minor contingencies abroad.
d. To maintain at proper strength the portion of the Army stationed abroad.

This last-named purpose led to the two-battalion or linked-battalion system—one battalion of a regiment being always abroad, and the other at home—it being shown above that practically half the present strength of the Army was at home, and the other half in India and the Colonies.

It has been generally considered that the Home Army would never be required to fulfil all its first three purposes at one and the same time; and that the portion abroad could be drawn upon to assist in the fulfilment of the second purpose. The South African War, coincident with the events in China, has shown the error of this view; the same combination of circumstances has also shown that the possible tasks of the Regular Army have been grossly underestimated, and its strength consequently allowed to remain too low, leading in recent circumstances to the practical denudation of the British Isles of trained soldiers and to the weakness of our policy in China.

The Regular Army as it should be.

What we want from the Regular Army are:—*a.* 3 army corps for garrisons of India and Colonies, *not* dependable upon to furnish contingents for offence elsewhere. *b.* 4 army corps at home always ready to mobilise for offensive operations, and also to maintain foreign garrisons during peace-time, and also to furnish forces for minor expeditions. *c.* 1 army corps as a nucleus for home defence, which must be made the duty of the manhood of the nation—total, 8 army corps, including reserves but excluding untrained men. These army corps must be complete in the matter of accessory units, though the 3 abroad cannot be organised as independent and self-contained corps.

The question is whether the Regular Army can be brought up to and maintained at this strength. Some hold that nothing more is needed than increased pay and the institution of separate bunks instead of large barrack rooms. We maintain that there are other means of attracting recruits. The young soldier at any rate, what with free clothing, free lodging, practically free food, and free medical attendance, receives as much pay as he deserves, and as, generally speaking he would obtain in civil life; and nine out of ten soldiers will tell you they don't want bunks, but what they want is smaller barrack rooms, accommodating, *e.g.*, 6 men (or a quarter of a section of an infantry unit).

Recruiting can be popularised by the following amongst other means:—1. Common-sense regulations interpreted in a common-sense way, which, roughly speaking, means decentralisation from top to

bottom of the chain of responsibility. 2. Common-sense drill.† 3. Company or half company dining-halls, instead of feeding in the rooms used for sleeping. 4. Smaller barrack-rooms and no overcrowding in barracks. 5. Voluntary instead of compulsory church parade. 6. No barrack damage charges, except for broken glass and locks, which are about the only articles that really are broken through carelessness or mischief. 7. Simplification of uniform, one dress for walking out and show parades, and one for all other purposes, both for peace and for war, and no more.† 8. Military training schools, at which the sons of present and past Regular soldiers could obtain free military training, as well as free education. 9. Exemption from income tax for all ranks, coupled with the possession of Parliamentary voting powers without preventive conditions as to residence, etc. 10. More certainty as to civil employment on return to civil life, through the retention of *all possible* appointments in *all* Government departments for the exclusive benefit of reservists, and especially of those soldiers who have served 12 years or more with the colours. 11. Increased good conduct pay, and extra pay for service abroad. 12. Facility for the removal of really bad characters from the Army;† nothing deters men of good class and education from joining the Regular Army more than the knowledge that they will have to sleep, feed, and work with men of disgraceful character. 13. Elastic terms for enlistment.†

It is mainly in the direction of the four last-named that the true remedy will be found. At present, most men enlist for 3 years with the colours and 9 in the reserve. Let the men enlist first on this understanding, but for 3 years' home service only; after his first 3 years let him extend his service with the colours for another 5 years, but for foreign service only, and pay him more for doing so; and then let him spend his remaining 4 years in the reserve; after his second term with the colours (his 5 years abroad), let him extend his service with the colours again for another 4 years (completing the 12 he enlisted for), but this time again for home service only; and lastly, after 12 years with the colours, let him re-engage for another 9 years' service that is, let him become a soldier for life.

This elastic system would necessitate some alteration in the organisation of the Army. According to the above-mentioned required strength there would (as at present) be practically half the Army in foreign garrisons: battalions would be linked as at present; home battalions would always remain at home, and would consist of young soldiers under 3 years' service, tempered by a leavening of older men of over 8 years' service; the cadres of the foreign battalions would remain always abroad (not of course always in the same station or even the same colony), and would consist entirely of fully-grown and fully-trained men; officers would be liable, as at present, to transfer from one battalion to the other. The home battalions would have to be kept up to full strength, and no man should leave the depôts until fully trained as recruits, the depôt barracks being enlarged accordingly. This idea retains the present evil (an unavoidable one) of the linked-battalion system, under which the home battalion is practically a depôt for the one abroad; but it would have these advantages, viz., that the home battalions would be up to strength at all times and would retain their recruits for at least 2½ years, whilst the battalions abroad would be made up of fully-grown and fully-trained men and

†See Note at end.

would contain no boys liable to enteric and other ills to which half-grown lads are liable. In case of any national emergency the garrisons abroad would remain unrelieved as they have done during the recent crisis; the full-grown men of the 4 army corps at home, plus the reserves, would form the Army for offence, and would be reinforced by Imperial Volunteers; the ungrown men of these 4 army corps would be formed, as recently, into provisional units as the army corps for the nucleus of the Army for home defence. I have referred to infantry only for the sake of simplicity; but other arms and also accessories would be treated in the same way

The suggestions mentioned in 10, 11, and 12, would, next to 13, have the most marked effect on the recruiting question.

The guiding principle must be held in view throughout; and this is, that the British Army in its aims, its conditions, and its *locale* is different from any other European Army, and must be dealt with and organised accordingly. It is both useless and dangerous to attempt to mould it on the pattern of modern Armies of Continental nations.

I think I have shown that the Regular Army can be maintained at proper strength without conscription; but that it is practically of no account for home defence, *i.e.*, for the defence of the citadel of the Empire.

The Auxiliary Forces as They Are

The defence of the citadel must be left to the manhood of the nation, in other words, to the Auxiliary forces.

These forces at present consist of, approximately, 110,000 Militia,† 10,000 Yeomanry,† and 240,000 Volunteers, the equivalent of 10 army corps. But as army corps they are at present useless; there is no proper organisation; there is a very great deficiency in artillery and in mounted men; there is practically an entire absence of the accessories (engineers, medical corps, transport, commissariat); and the degree of readiness and training is very variable and in many cases negligible.

The Requirements for Home Defence.

What strength is required for the Army for home defence? In the "Purposes of the Regular Army" 3 army corps are laid down. We have already allowed 1 army corps above as a nucleus. But it is certain that 2 more army corps, consisting of auxiliary forces even if properly organised and trained, would not be enough.

We want in the first place, in addition to the 1 Regular army corps, 3 army corps of Auxiliary forces, the 4 corps being required as a mobile field army. These three Auxiliary corps must be properly organised, and must contain the proper complement of the combatant arms (except field artillery) and of the accessory arms; the artillery would have to be provided by the Regular Army, which must in this respect be increased accordingly, because artillery of the requisite efficiency for *offensive* operations cannot be produced through the intermittent training of the Volunteer and can *only* be produced through the continuous and lengthy training of the Regular soldier. These 4 corps would have to be embodied in a thoroughly worked out scheme designed to repel a sudden invasion on any portion of our coasts.

In addition to these 3 Auxiliary corps, we want *as many riflemen as we can get*, who would reinforce the field army, but whose prime

duty would be local or internal defence; these riflemen need not be otherwise trained in a military sense, nor need they be fully organised into large field units.

It is submitted that we can obtain all this by a system of compulsory volunteering without resort to conscription.[1]

The Auxiliary Forces as They Should Be.

Every able-bodied man between the ages of 18 and 35 who is not already serving his country in the Regular Navy or Army (except certain exempted individuals such as clergymen, the physically incapable, etc.), should by law be compelled to become a Volunteer.

These Volunteers should be divided into two classes:—

a. Imperial Volunteers.†

b. Volunteers (ordinary, or home service).

The first class would be primarily for the reinforcement of the Regular Army in offensive operations of an emergent character abroad; the second class would consist of:—

1. Certain units selected to form the 3 Auxiliary army corps for home defence.
2. The remainder.

Any man might, under certain restrictions, transfer himself from one class to the other.

Imperial Volunteers.

The Imperial Volunteers would consist of those men between the ages of 22 and 30 who, being physically fit and qualified in a military sense, would undertake to serve abroad at times of emergency; such a time being defined as the period when all the Reserves of the Regular Army had been called up.

They would be organised in units of infantry, mounted infantry, and of the accessory arms. For the cogent reason stated above they could not provide artillery. They would be affiliated to corresponding units of the Regular Army, and would reinforce those units during protracted offensive operations. They would be clothed, armed, and personally equipped by the Government; regimental equipment as under the present system would not be required. In order to qualify in a military sense, each man would have to pass satisfactorily through an annual musketry course *distributed throughout the year*, efficiency in musketry being rewarded by generous shooting prizes, and failure to attain at least to the merits of a third-class shot being met by removal from the Imperial list; each unit would also have to undergo annually a month's continuous training with a corresponding unit of the Regular Army, preferably during combined manœuvres, receiving during that time full military pay and allowances. Each man would have to undertake the Imperial burden for at least two years at a time. At the end of his month's training he would, if passed medically fit and qualified in musketry, receive a retaining fee in arrears on his past year's service.

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[1] i.e., for home defence only; see paragraph marked * further on.

The administration of the units of Imperial Volunteers would be directly under the War Department.

Home Service Volunteers.

The Volunteers (ordinary) would consist of all the remaining men in the country between the ages of 18 and 35, except the exemptions.

These would be organised in units of infantry, mounted infantry, and of the accessory arms; also of position artillery, and heavy field artillery. They would not be affiliated to the Regular Army, but would be organised by districts corresponding to the jurisdiction of Urban and Rural District Councils.

The pick of them would be organised into the three Auxiliary army corps (less field artillery) required for the field army for home defence. These picked units would have to be provided with arms, personal equipment and regimental equipment by the Government; uniforms would not be necessary, only arm badges. The mobilisation equipment and reserve ammunition would be stored in central positions; and (with a scheme of railway transport correctly worked out) all the units would be kept ready to concentrate within 48 hours in any part of the Kingdom.

The remainder of the ordinary Volunteers would receive arms and personal equipment from the Government; they would be meant for inland defence, and would have certain positions in their districts told off for occupation, which they should be able to occupy in four days.

To qualify in a military sense all ordinary Volunteers would have to pass satisfactorily through an annual musketry course *distributed throughout the year*, and also to undergo annually a week's continuous training. As regards musketry, each man would have to fire a certain number of rounds every month, choosing within limits his own day to do so; efficiency in musketry being encouraged by a further course for such as are not third-class shots and generous prizes for marksmen. The training would be carried out on the ground allotted for defence and at various times to suit local conditions; during this training, the men would receive full military pay, but without allowances.

The administration of the ordinary Volunteers would be carried on through the Urban and Rural District Councils under the supervision of the County Councils, each Council having the assistance of an inspecting staff of officers on full pay, and each unit the assistance of an instructional staff of officers and non-commissioned officers on full pay or in the reserve.

To encourage *esprit de corps* and community of interests the units would be formed from men in the same or similar employment or profession. For instance, doctors, chemists, etc., might form medical staff corps; ambulance and fire brigade men and hospital attendants might form bearer companies; bargemen, wharfingers, boatmen (exclusive of sea-faring men who must be retained as a naval reserve) pontooning companies; jobmasters' men, cab drivers, carters, etc., transport companies; and grocers, butchers, bakers, etc., commissariat companies; working farmers and agricultural labourers would form engineer (*i.e.*, pioneer) companies, as would builders and their artisans; railway employés would form railway companies; and on the same principle of *camaraderie* the large landowners, brewers, and manufacturers would be encouraged to form complete units from their own employés.

For simplicity I have treated foot soldiers only, but the present misnamed "Imperial Yeomanry at home" would be organised on the same principle as "Imperial Yeomanry" and "Yeomanry," and would be raised in the same manner.

Rifle Shooting the only Requisite.

It will be seen that the only requirement from Volunteers for home defence is efficiency in rifle shooting; and this must be considered a *sine quâ non*, in fact the all in all.

In these days of extended order movements, when an action can seldom if ever be brought to a finish, proficiency in complicated movements in masses is not so necessary as individual intelligence and good shooting; witness the success of the British and Colonial Irregulars in South Africa. A sufficient knowledge of drill to enable men to move together without confusion can be learnt in a week's training, *provided* physical drill and simple military movements are practised by law in *all* male schools. Individual intelligence is the birthright of the nations of British blood, and only requires to be fostered.

Rifle shooting, however, *must* be taught; but it is only necessary to compulsorily teach Volunteers for home defence to shoot up to 500 yards; for it is acknowledged that almost every man can be taught to shoot up to and inclusive of this range, whereas beyond this range it is only waste of time to teach those men who do not possess the natural ability, the physical fitness, the clear eye, and the strong arm required for long-distance shooting.

Rifle Ranges the only Need.

The whole question, therefore, of the safety of the citadel of the Empire from invasion depends upon the provision of rifle ranges up to 500 yards in every locality of that citadel. There are few localities where such ranges cannot be obtained by paying for them; the acquisition of the necessary land should be made the business of the County and District Councils, who should be empowered to make compulsory purchase of the ground required, and to depopulate and relet for grazing or afforestation the area behind the targets commonly called the danger zone. The construction of the ranges would be an inexpensive matter; windmill targets, or those running on trolleys as used in India, are very cheap and can be easily erected anywhere. The construction and the maintenance would be in the hands of the local authorities.

The above scheme is, of course, merely a rough sketch; further details as to organisation and control would have to be worked out most carefully. The exceedingly difficult questions also of exemption from service and of registration would have to be settled; but these difficulties would be met with in an even greater degree if the alternative of conscription pure and simple were adopted for our salvation.

The further details can be worked out later; what is now wanted is voluntary effort from the public to force the hands of the Government which does not seem ready to take up its responsibility. Lord Salisbury hit the nail on the head when he stated that the salvation of the country would be found in local rifle clubs; but this veiled truth was treated with derision. Rifle clubs, however are just what we do want for the present, as a nucleus for, and an aid to, the greater scheme.

In evolving any scheme for home defence by Volunteers it must be borne in mind, as in the case of the Regular Army, that by reason of its insular position the conditions of this Country are different to those of foreign Continental nations, and that an Army for our home defence must be raised and organised accordingly; it need not be as numerous or as fully trained or as completely organised as the Armies of our rivals.

The Public Ignorance of the Nation's Danger.

The general public are extraordinarily ignorant of the unsafety of their home and of the nation's weakness; take any man in the backwaters of the country *and* of the towns, and you will find him unaware that the idea of universal conscription has even been mooted.

Let the public be made thoroughly aware that this question is a present as well as a burning question; that either conscription pure and simple[1] or else compulsory volunteering is necessary for the general safety; and that a choice between the two alternatives must be made before it is too late.

Let them thoroughly understand the difference: that in either case every able-bodied man will have to attend a periodical course of military training, and in either case be liable to be called out at any moment for actual service against an invader; that conscription will mean that for one, two, or three continuous years of his best manhood he will be withdrawn from his employment, and during that time will have to wear uniform and keep himself clean and submit to the discipline and the restrictions and chances of a Regular soldier; that compulsory volunteering, on the other hand, will mean that he need only learn to shoot (choosing practically his own time), undergo short trainings in his own district and amongst his own friends, and otherwise be at liberty to follow his own profession. Let the military Members of Parliament issue a pamphlet setting forth the urgency of this question being taken up and settled forthwith and the pros and cons for each alternative; and let this information be thoroughly circulated in the country, through lectures, meetings, etc., by the civil authorities and by leading men. Can it be doubted which alternative the nation would choose?

*It is assumed that conscription for universal service can never be adopted, and that conscription for home service is all that can be attempted.

In favouring the alternative of compulsory volunteering it is furthermore assumed that a mercenary (that is a voluntary) Army (such as ours by the fortune of our insularity now is) always was, and always will be, a more effective weapon, man for man, than an army of conscripts. And an army of compulsory Volunteers will still, as compared with an army of conscripts, be a voluntary Army; for each member of it will have *volunteered* to undergo a minimum of military training in order to avoid the evil of conscription.

The Militia Unnecessary.

It will be noticed that in the above scheme all mention has been omitted of the present Militia. It is contended that the Imperial Volunteers would form an efficient substitute.

It is submitted that the Militia *in its present form* is not worth the money expended on it. It is practically useless, because it is and, under its present conditions, always will be under-officered; it cannot

[1] *i.e.*, for home defence only; see paragraph marked * further on.

be used to reinforce our Regular Army on foreign service, much less on active service, except on its own desire; its organisation is defective; its training is no better and no longer than that proposed for the Imperial Volunteers. In saying this, I by no means wish to cast any slur on the members of the Militia; their defects are due to the terms of enlistment, the class of men enlisted, the organisation, and the training.

Many persons claim that the Militia assists recruiting for the Regular Forces, because many men who join the Militia take a liking to military life and re-enlist into the Regulars; but it may be argued with equal justice that the majority of such men would join the Regular Army in the first instance if there were no Militia to attract them; and it may also be argued that many men who join the Militia are actually deterred by the discomforts they encounter and the bad class of men they meet therein from obtaining a transfer to the Regulars.

Cost of the Requirements.

It is contended that this question should be put aside as not one for consideration. Many of us as individuals insure our lives, and most of us as individuals or corporate bodies insure our property. Why should we not do so as a nation? for that is what the question comes to. Any additional tax or burden, caused by the expense of compulsorily trained volunteers, would be merely in the nature of additional individual insurance. What would not many of us lose if any of the larger Colonies were lost to us? What would we not *all* lose if our own country was invaded, even if the invader were beaten back after a time?

Political Value of an Armed Nation.

And lastly, as to the political value of a nation of trained riflemen. Supposing the Imperial Volunteers numbered only 160,000, and the Volunteers only 4,000,000; would not our hand be stronger in the frequent conflicts of European aspirations in the Near East and in the Far East, and would not other Continental nations be less inclined to thwart us abroad and talk of invasion at home, if it were known that our Regular Army for offence could be reinforced at once by the equivalent of 4 army corps of sufficiently trained soldiers, and that an invader would have to contend with the equivalent of 100 army corps of trained riflemen? Of course.

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†Note.—Since this paper was written, the following recommendations have already been more or less carried out, viz.:—The Field Artillery has been considerably increased; the pay of the rank and file has been raised; a new Infantry Drill has been initiated which is essentially common-sense; a new service dress has been issued for peace work and for active service; commanding officers will be able to prevent bad characters remaining in the Army beyond their first three years; terms of enlistment have been made more elastic, and the 3 years' limit for first period has been extended to more branches of the Army; the establishment of the Yeomanry has been trebled, and a real Reserve inaugurated for the Militia; a system of allowing a certain number of Volunteers to render themselves liable to Imperial service has been set on foot. Also some minor attempts have been made to popularise recruiting by allowing soldiers to wear plain clothes when on leave out of their stations, and to smoke in the streets in uniform when not on duty, and by abolishing coal-fatigues and night roll calls.

THE TORPEDO-VIRATOR.

By Rear-Admiral BÖRRESEN,
Chief of the Staff of the Norwegian Navy.

ADJUSTABLE gyroscopes, that is gyroscopes that can be so regulated as to make the torpedo run in any angle from the line of sight, are hardly used in any Navy at the present moment, because the gyroscope is considered too complicated and too fine an instrument for such regulations in the last minute before firing the torpedo.

But whether the gyroscope is regulated, or constructed to work, in the axis of the torpedo or to work at a certain angle, of say 30°, from this axis, when the gyroscope is *permanently* fixed for this angle—this circumstance evidently has nothing to do with the regular working or the complication of the instrument. The gyroscope, in fact, will do its duty without knowing that it is deflecting a torpedo 30° from the line of sight.

Or rather, gyroscopes *permanently* fixed to deflect a torpedo a certain angle from the line of sight cannot be called adjustable gyroscopes at all. They are just as good and just as safe as those that are constructed for a straight run.

The reason why these *permanently* deflected gyroscopes are not in use is most likely the circumstance that they require an exact knowledge of the distance to the hostile ship at the moment of firing.

Fig. 1.

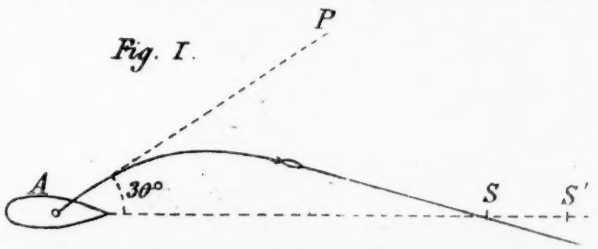


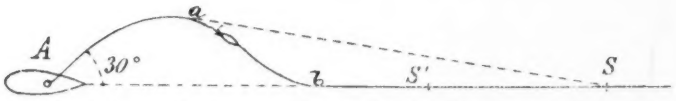
Fig. 1 represents a torpedo-boat that fires her torpedo with a gyroscope deflected 30° to the right. The line of sight is *A S*, the line of launching is *A P*. With a gyroscope deflected 30°, the torpedo will hit the vessel *S* only if the vessel just happens to be in the point where the trajectory of the torpedo and the line of sight cross each other. But if the hostile ship is in the point *S'*, the torpedo will miss her.

As a consequence one cannot use deflected torpedoes unless one knows the distance to the ship fired at, and corrects for it—which is out of the question.

To do away with this difficulty, and at the same time have all the advantages that a deflected gyroscope gives, I have devised and tried

in the Norwegian Navy, with great success and accuracy, a small and very simple instrument, which makes the torpedo run into the sighting line again as soon as it has been deflected (see Fig. 2).

Fig. II.



That is to say it does not follow the dotted line *a S*, Fig. 2, but continues its curve until a point *b* near the sighting line, and then runs into this line; in short, the torpedo is given a "flat" trajectory.

This arrangement will give one the advantage of being able to fire right ahead (or right astern) from a ship, without stem or stern tube, and hit with the same accuracy as if direct firing had been used.

The instrument has been tried continuously at the naval shooting ground at Horten, and every time the torpedo has run into the sighting line as if it had been shot out by direct firing, although its original angle of launching has been 45°.

There need, therefore, no longer be any guessing of the distance; the torpedo will hit the hostile ship whether she is in *S* or *S'*.

Let me repeat again that this process of indirect firing need not involve any regulation of the gyroscope in the last moment.

The gyroscope in this torpedo is *always, from the very beginning*, made to work in an angle of 30°, or 45°, or 90°, etc., with the axis of the torpedo. And the little instrument, which I propose to describe, does not interfere with the ordinary working of the gyroscope, or rather it does not touch it. It is placed on one of the "fins" of the torpedo.

If the hostile ship is in the point *S* (Fig. 3), one uses the same torpedo and lets it make the same curve.

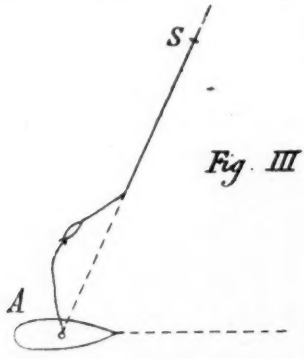


Fig. III

If a torpedo-boat has two torpedo-guns, it is advisable in the foremost gun to have a torpedo with a gyroscope deflected 30°, for instance, to the right, in the after gun a gyroscope deflected 30° to the left; as this arrangement will give an all-round fire, and an all-round torpedo fire is a very important thing for a torpedo-boat, which in a dark night

must be prepared to meet an enemy in any direction, and naturally prefers to fire as soon as possible without taking the time to turn the vessel. This will be seen from Figs. 4, 5, and 6, Fig. 4 representing a torpedo-boat with two torpedo-guns of the old system, that cannot

Fig IV.

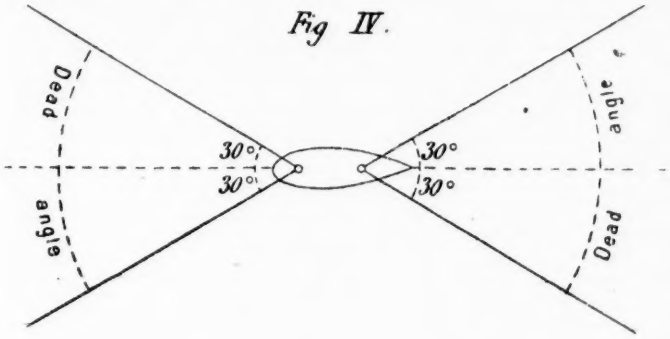
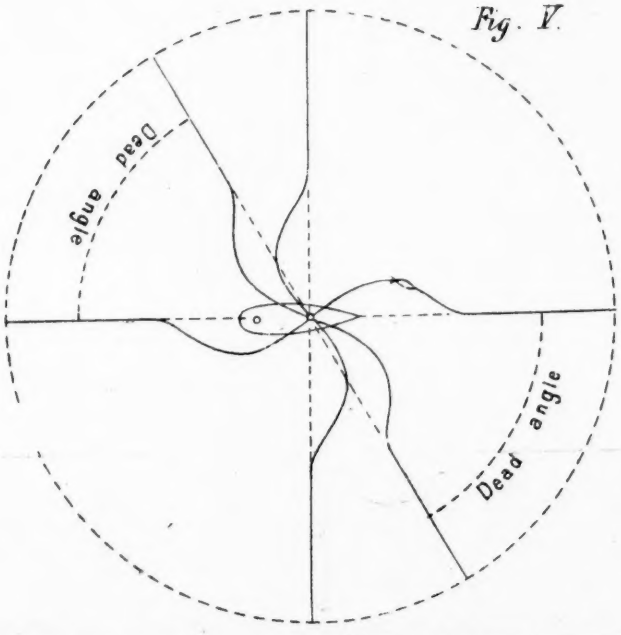


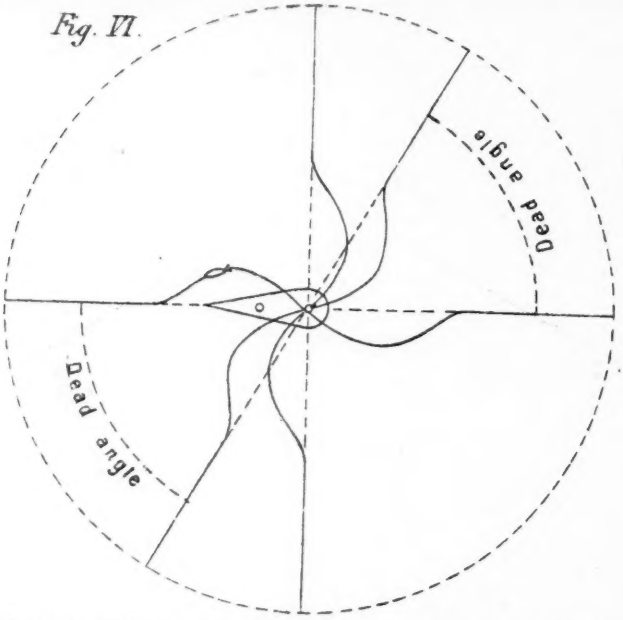
Fig. V.



fire right ahead or right astern; Figs. 5 and 6, the same torpedo-boat with all-round fire by the above-named device, her fore torpedo deflected 30° to the right and her after torpedo deflected 30° to the left.

From a constructional as well as from an administrative point of view, it is a great disadvantage to have in a large ship several torpedo-batteries in stem, stern, and amidships.

Fig. VI.



By this device all the torpedo-tubes can be concentrated in one great torpedo discharge-room amidships; one tube to be used for stern fire, one for stem fire, and two for beam firing (see Fig. 7), and possibly also tubes for firing 45° on the bow or quarter.

Fig. VII

By this arrangement one also avoids that danger by stem-firing, that the ship can run into her own torpedo if the torpedo is not properly launched.

From what is above mentioned it will have been understood that the gyroscopes in these torpedoes are *permanently* fixed to work in a

certain angle from the axis of the torpedo, and as a consequence, in the moment of firing, automatically lay the vertical rudder hard port (or starboard).

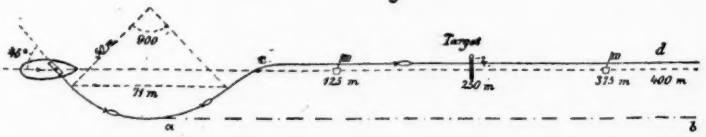
The function of the torpedo-virator is to keep the rudder in this position (hard port or hard starboard), until the torpedo is in a point (*b*, Fig. 2) near the sighting line.

When the torpedo has reached point *a*, that is, has turned 30°, the gyroscope will (without this instrument) steady the torpedo, and a faulty angle will arise, which requires for its re-adjustment a knowledge of the distance.

The instrument, however, which I propose to introduce, keeps the rudder hard port (or starboard) until the torpedo reaches point *b*, near the sighting line, and then lets the rudder free to be worked by the gyroscope.

After this point *b*, therefore, the torpedo will run a straight course —keep in the sighting line,—and that it really does so, my experiments abundantly show.

Fig VIII.

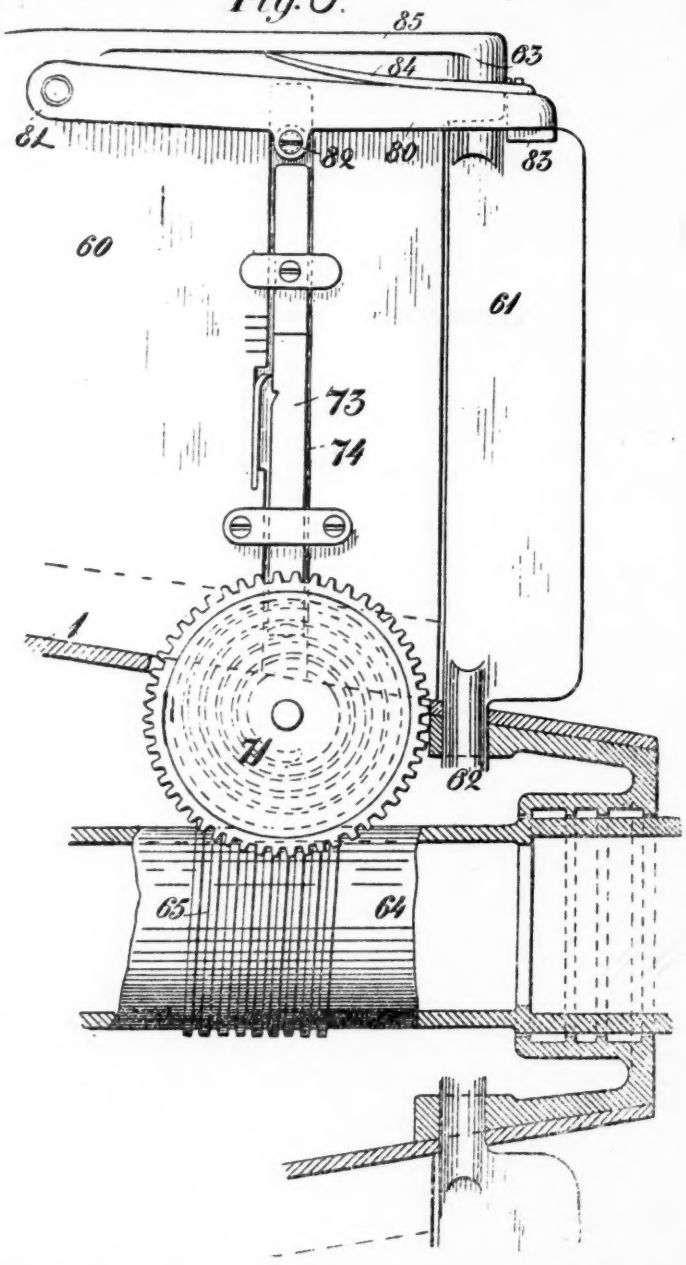


The above-mentioned apparatus is illustrated in Figs. 9, 10, and 11, in which number 1 indicates the shell of the torpedo. 60 is one of the fins, 61 one of the vertical rudders, having one of its bearings in the shell at 62, and the other at 63 near the edge of the fin. 64 is the shaft of one of the propellers. This shaft is provided at 65 with screw-threads. Right above this point, on a fixed axle, 66, a screw-wheel, 67, is loosely mounted, engaging with its teeth the threads of the screw 65. Close to this screw-wheel another wheel, 68, is also loosely mounted on the axle, 66. By means of a screw, or pin, 69 in the wheel 67, entering a hole, 70, in the wheel, 68, the two wheels may be coupled together in an easy way. The wheel 68 is provided with a spiral groove, 71, on its other side, and entering this spiral groove, with a pin or projection, 72, a radially movable pusher-rod, 73, is mounted in a radial slot, 74, in the fin 60. Near the edge of the fin an arm, 80, is mounted. It is shown as composed out of two branches, one on each side of the fin, united at the fulcrum by the pin 81, at the middle by a stay, 82, and at the end, where on the underside it carries a triangular lug, 83, which serves as a stop for the rudder. The arm is held down by a two-armed spring, 84, acting against ribs, 85, on the fin.

In the position shown the said lug holds the rudder starboard.

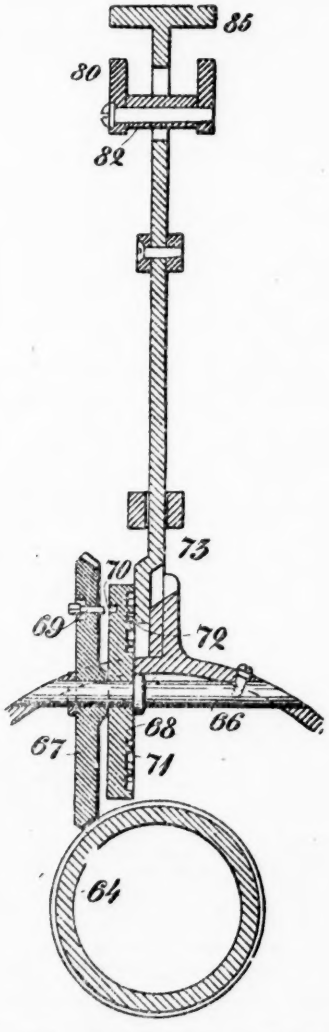
When the screw, 65, rotates, it drives the wheel 67, and this being coupled with the wheel 68, causes this to rotate, and the spiral groove on the latter will force the pusher-rod, 73, upward, so that its end will hit the arm, 80, and lift it, whereby the rudder will be released so that it can move freely. By loosening the screw 69, the wheel 68 may be turned, whereby the starting position of the pusher-rod, 73, is adjusted and thereby the apparatus timed. An index may, as shown, be provided on the rod whereby the exact adjustment for different angles of ejection may be provided for.

Fig. 9.



Experiments with the before-described apparatus have been carried out with different types of torpedoes at the Norwegian naval station at Horten, and they have all shown that it works with the greatest possible accuracy.

Fig. 10.



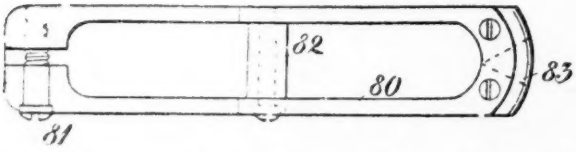
The adjustment of the wheel 71 (or the push-rod, 73) will, of course, depend on the angle between the torpedo-tube in the moment of firing

and the line of sight —the gyroscopic angle—and the turning diameter of the torpedo, but for the same torpedo and the same angle the adjustment will always be the same. The wheel 71 has to be regulated for a number of teeth corresponding to the number of revolutions of the engine until the torpedo has reached the sighting line.

The first experiments were made with a 3·7-metre by 45-centimetre torpedo, with Woolwich tail, and turning diameter of circa 100 metres.

The torpedo was launched from a torpedo-gun 3 metres above water, and the gyroscope regulated for an angle of 45°. The wheel, 71, was set for 79 teeth (that is to say, the vertical rudder would be free to be acted upon by the gyroscope when the engine of the torpedo had made 79 revolutions).

Fig. 11.



Without the apparatus the torpedo would have had a trajectory, *a*—*b*, Fig. 8, 24 metres, to the right of the sighting line and the centre of the target.

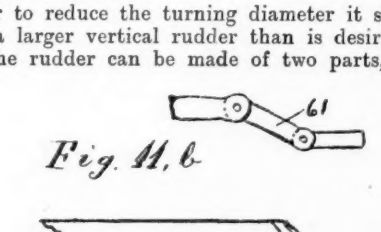
It now continued its curve, however, till the point *c*, where it lay the rudder hard port, and swung into the line *c*, *d*, parallel to the sighting line, and 2 metres to the left of the centre of the target.

The wheel (71) was then set for 78 teeth, and the torpedo ran through the centre of the target.

Later, many more experiments have been made with the same excellent results, also with the long torpedoes with Fiume tails and wider turning diameters, which, however, it is always preferable to reduce as much as convenient.

If in order to reduce the turning diameter it should prove desirable to use a larger vertical rudder than is desirable during the straight run, the rudder can be made of two parts, the after part

Fig. 11, b



hinged to the foremost part so that it is loose and does not affect the steering when the triangular lug, 83, has been pushed up.

THE COMPANY CART.

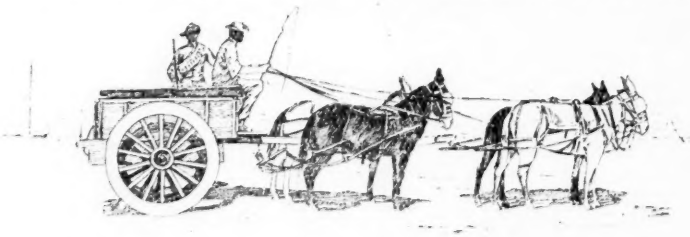
By Major G. W. W. SAVILE, D.S.O., 2nd Bn. Middlesex Regiment.

IN these days, when mobility and decentralisation are so much sought after, I often think much might be done to make a company more self-supporting. Under present arrangements no company can have its regimental head-quarters for even one night without first indenting on the Transport Department or on the Regimental Transport Officer for a wagon to take out its kits, rations, etc.; or even if a section is required to go out as a picquet, the same steps have to be gone through to procure a pack-mule to carry out their blankets. Now, all this is against mobility, and might be simplified by giving each company (when on service) its own cart with four mules; and though the expense might be a trifle more than under existing arrangements, yet the comfort and the efficiency of the men would far out-balance this small outlay. No one but a company officer knows what a difference to his men's comfort such a cart would be. During the early part of the present war, in Natal, infantry regiments had only one water-cart allowed them. These carts hold about enough water for the supply of four companies, so it can be imagined how often a company officer saw his men returning from the cart with the old story "No water left," and then they had to wait till the cart had driven off to some stream to fill up again, by which time the brigade had probably fallen in and moved off; but you will naturally say Yes, that may be true, but you are now talking about a water-cart, and you profess to be writing about a company cart. Just so, but my ideal company cart is also a cart which carries water. Take one more case: a regiment on arriving in camp details its companies for outpost. Let us say A and B companies, who have their blankets together in one wagon [N.B.—We had one wagon for each two companies during this campaign] are told off as outlying picquets. A goes up a kopje a mile to the right, and B takes a line of hills the same distance off on the left. As it was dark when the regiment reached camp, and it may be an hour later before the brigade wagons come in, you can picture to yourself how A and B companies fared for greatcoats and blankets that night. A might get them; if so, B did not; and besides, the transport animals in A and B's wagon, instead of being able to outspan on reaching camp, had to drag their heavy wagon across country to get to the outpost companies. Now, with the "company cart" all this would be saved. Having, I trust, now shown the need of a cart of some sort, let me state what I consider would be the most useful general type of cart for this purpose, and unhesitatingly I say the "Scotch cart," so well known in South Africa, is *par excellence* the best for this purpose. For those who are not acquainted with this cart I would explain that it is a two-wheeled box cart, fitted with a Cape brake and drawn by four mules, with pole

draught; it carries 1,000 lbs. weight. The only addition that I propose making to this cart is to fit in two small galvanised iron tanks below the body of the cart, but not coming below the axle-tree (one being in front and one behind the axle-tree, and filled through funnels on each side). These tanks should hold six gallons of water each, which allows about one pint for every man in the company, and when full would weigh about 75 lbs. each. I think also that a raised seat might be added to the cart for the driver and the soldier in charge of the cart and the water supply, as a raised seat gives more space in the body of the cart. In this cart I would carry the following articles, viz:—

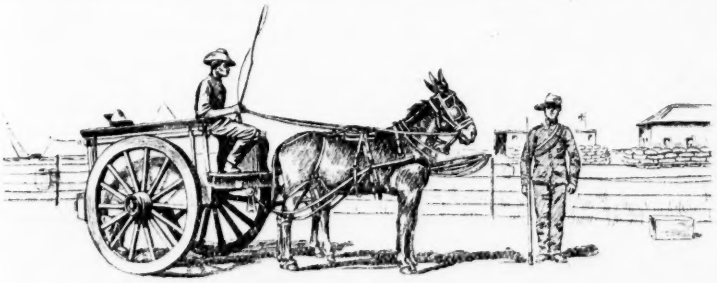
		lbs.
80	greatcoats - - - - - - weight	640
4	camp kettles - - - - - - „	36
1	axe - - - - - - - - „	7
1	water bag (canvas) - - - - - „	4
2	boxes of ammunition, weight (80 lbs. each)	160
2	tanks of water (underneath), weight when full of water about 75 lbs. each - - -	150
	Total - - - - -	997

Note that I put 80 greatcoats. Although 100 is the usual paper strength of a company, 80 is nearer the marching strength. Of course



the usual regimental baggage wagons would be required to carry the men's blankets, spare kits, etc., but one wagon less will be required owing to the greatcoats and part of the cooking utensils being on the company carts. Again, the company carts can be utilised to take out the blankets, etc., to the companies on outpost, and so relieve the regimental wagons of this extra work. A company supplied with a company cart can at once settle down either in camp or on outpost, where teas can at once be cooked, and if it is wet or cold the men have their greatcoats ready at hand to put on, instead of having to wait about in the cold, sometimes for hours, before their things arrive. With the water-tanks on the cart there will always be a ready supply of water for the teas or to cook the dinner. I propose putting small pack saddles on the two leading mules, which would in no way interfere with the draught, and could be used if a section or any small party is required to go out to any place where the cart could not accompany them; the two pack mules are then available to take water in the water bags and to carry reserve ammunition, a camp kettle, etc. At present a company is usually given two pack mules, so the extra expense of the company cart would only be the two extra mules and the initial outlay, plus the repairing of the cart, both very small items; eight extra mules

per battalion being the whole of the extra outlay (as you save eight mules over the wagon no longer required to carry the greatcoats); and what is this when compared with the extra comfort, and I would add the extra efficiency also, of the men of each company? There is a great difference between the tired soldier hungry and wet, and the same article when he has had something warm to drink and has got a coat to keep off the wet. What the difference is is best understood when you come to live with him, and you will then realise how very true the saying is that "an Army fights on its stomach." I am sure that all infantry company commanders will bear me out in this, that a company cart is a real necessity—I say infantry, as I notice that the cavalry have their troop or squadron carts, and generally a water-cart as well,



and are consequently much more mobile. Of course, the company carts would be with the first line of transport immediately behind the battalion.

Camp Spruit,
Upper Tugela Block House Line,
24th May, 1902.

P.S.—I enclose three photographs of the proposed company cart. The corrugated iron nailed on underneath represents the position only of the two water-tanks, which would have taps behind and at each side from which to draw off the water.

The photographs were taken outside Quaggas Nek block house on the Drakenberg, just west of Majuba Hill.

A QUESTION OF AN EXCHANGE WITH SPAIN IN THE MEDITERRANEAN.

By Major T. R. HARKNESS, Royal Garrison Artillery.

MUCH has been said and written lately about the question of naval docks at Gibraltar. The primary object of these docks in time of war would be to keep up the speed of the fleet in adjacent waters by affording opportunity to the ships of having their bottoms cleaned. The repair of minor injuries received in action could also be carried out, but heavy pieces of work entailing large forgings, etc., would necessitate the vessels being sent home.

Gibraltar has belonged to Great Britain since 1704, and it seems somewhat unfortunate that the construction of docks has only been undertaken when they are no longer safe from the fire of a possible enemy. There is no doubt that the docks at present being constructed on the west side are exposed to the fire of long-range artillery from the Spanish mainland adjoining the bay. On this account many people have strongly advocated the construction of a harbour and docks on the east side, under the impression that they would be safe from attack. It is true that a dock could be constructed close into the cliffs on this side where a ship would be invisible from the Spanish coast within range, but it by no means follows that she would be safe from high-angle fire from the direction of the Queen of Spain's Chair. To protect this dock from the eastern gales it would be necessary to construct immense breakwaters, in deep soundings, at a cost of many millions of pounds. A very serious problem presents itself. Can we obtain the strategical objects aimed at in a more complete and satisfactory manner by any other means?

The answer appears to be Yes, if we will give up Gibraltar to Spain in exchange for other territory.

Many people are in favour of exchanging Ceuta, the opposite Pillar of Hercules for the Rock, in the belief that docks could be constructed there where our ships could repair and refit in safety. This is not the case.

An examination of a chart or map of the country near Ceuta will show that the peninsula, from a military point of view, is much the same as Gibraltar, with its faults intensified. The surrounding country, belonging to Morocco, is much nearer to the extreme point of Ceuta than the Spanish mainland is to Europa Point, and the hills within range have a substantial command over the highest part of the promontory, whereas the Rock commands all the country within range of the most modern guns. The country held by Spain consists of successive ranges of hills facing Ceuta, and decreasing in height as they approach it. It will thus be seen that the conditions are favourable to the deliberate attack. On the other hand, the country beyond the Spanish lines is so wild that extensive preparations would be necessary,

and large quantities of stores would have to be gathered together. It is unlikely that this would be undertaken unless the possession of the fortress was of great importance to the Power concerned. Thus, if it were made a dockyard, it would be liable to deliberate attack; but if only a torpedo-boat station, sudden raids supported by such guns as could be landed from ships, are all that might be expected.

The present Spanish defences on the land side are quite capable of resisting anything of this nature. They consist of a line of large stone towers, loop-holed for infantry and connected by telegraph. In support of these are what are called forts, but which are really only defensible barracks for infantry, without guns of any kind. Again, in rear of these are the elaborate old Portuguese fortifications stretching across the isthmus with a wet ditch from sea to sea, four feet deep at high water. These are not now armed, being entirely of stone and brick; but, all the same, they would be very useful in securing the peninsula from being rushed. They bear the marks of many a hammering from artillery, such as the Moors were able to bring against them in days gone by. The Spanish territory round is very fertile; a rich soil, and apparently plenty of water. Vines seem to do very well, and there is a certain amount of grain cultivation. The farm-houses have a clean and prosperous look.

The town of Ceuta is situated on the isthmus, just inside the old Portuguese fortifications. It also is clean and prosperous. The noticeable feature is the presence of convicts, earning their own living, without any guard over them. The only distinguishing mark between them and the rest of the inhabitants is a round brown flannel cap, like a forage cap. Above the town rises a dome-like hill of Ceuta itself, crowned by the convict establishment, where there are at present about two thousand convicts. It is only as a penal settlement that Ceuta can be said to be of any real use to Spain. The harbour consists of a small bay, with fairly deep water close in shore, on the north side of the isthmus. It is defended by several works, some of them mounting modern breech-loading guns of great power. There are also forts near the lighthouse, on the east side, to prevent long-range bombardment. A camber for torpedo-boats and destroyers could easily be constructed on the west side of the bay, protected from artillery fire from the direction of the mainland. It will thus be seen that Ceuta would make a very useful coaling station, and afford a base from which torpedo craft could raid adjacent waters and make the passage of the straits insecure.

All this, however, brings us no nearer the provision of dock accommodation for large vessels, so we must look elsewhere, and no place in the western waters of the Mediterranean seems to meet the case better than Minorca, with its magnificent harbour of Port Mahon.

An examination of a large-scale map will show that Port Mahon offers great facilities for the construction of docks secure from attack. The harbour consists of an arm of the sea, about three miles long, with deep water creeks running off it on both sides, and two or three islands in the middle. Its width averages about half a mile. There is excellent anchorage for a large number of the heaviest battle-ships, the holding ground consisting mostly of sand, shells, and gravel. Along its sides run hills protecting it from fire, and offering sites for forts with a good command of the surrounding country. The highest points of these hills are at the entrance to the harbour, where the old Fort St. Philip and the modern and powerful La Mola deny the passage.

If there are no engineering objections, Port Mahon thus appears to be an ideal place for the construction of dry docks. Its position is about six hundred miles from Gibraltar, which may at first seem an objection, but further examination will show that it is in a grand naval strategical position. It lies, more or less, at the centre of a circle, on the circumference of which are the great naval ports of Cartagena, Toulon, Genoa, and Spezzia. Should the fleets of possible enemies be attempting to combine for any of these ports, no better naval base could be asked for than Port Mahon for a blockading fleet. It also lies in the direct line between Toulon and Algeria, and would menace the communication between the south of France and that great French colony.

Holding the whole island, the supplies of food and water to the fortress of Port Mahon would be a small question compared to that in Gibraltar, where we are dependent on Spain and Morocco for fresh meat, and the heavens for water. The island of Minorca, about two hundred and sixty square miles in extent, is well stocked with cattle, sheep, goats, and mules, pasturage being abundant. Fruits of various kinds, and vegetables, are plentiful, and wheat and barley are cultivated. Thus provisions are plentiful and cheap, and the water supply need cause no anxiety.

Minorca was captured by the British four years later than Gibraltar, *i.e.*, in 1708, after little resistance. We held it, with great advantage to the fleet, till 1756. In this year a great French expedition was planned against it. The British fleet was enticed away on other work. Then the Duc de Richelieu, with fifteen thousand men in a hundred and twenty transports, convoyed by La Galissonière with twelve sail of the line, laid siege to Port Mahon, in which was a meagre garrison under General Blakeney.

They held out most gallantly in Fort St. Philip for seventy days, but eventually capitulated with the honours of war. It was during this siege that the relief was attempted by Byng, without success. For this he was superseded and eventually tried by court-martial and shot.

In 1763 we regained Minorca by exchanging for it Cuba and the Philippines, so recently lost by Spain to the United States of America. We once more lost Minorca, after a memorable siege, in 1782. On this occasion the expedition started from Cadiz, under the Duke of Crillon, as if to attack the British West Indies, but turning round, slipped through the straits and sailed for Minorca, where they landed eight thousand men. General Murray, the Governor, retired into Fort St. Philip with his small force of four regiments, and did not surrender until it had been reduced by scurvy and other diseases to six hundred. He then gave in on honourable terms, and marched out between the lines of the besieging force, which had been reinforced to a strength of fourteen thousand.

Minorca capitulated to Sir Charles Stuart in 1798, after the battle of the Nile, but in 1802 the then Government, thinking Malta sufficient for our wants in the Mediterranean, ceded it to Spain under the treaty of Amiens.

We now come to the political question. Would it be possible to effect with Spain an exchange of Gibraltar for Minorca or Ceuta? It is, to a great extent, a question of national pride. We look on the Rock as a landmark in our history, especially in connection with the great siege of 1779-82. Spain looks on it as a part of her fatherland, and in her history it has fourteen sieges. Any of those who have come

into contact with the Spaniard can know how deeply he resents our retention of this part of his country, the original acquisition of which was effected under very questionable circumstances.

Ceuta is only a penal settlement on the African coast, which costs a good deal of money and would probably be parted with without regret. Minorca, far removed from the mainland, is inhabited by a people who are not Spaniards, and it affords but a small diminishing revenue. As seen above, it has several times been in our hands. Traces of our occupation are to be found to this day in many English words in the local dialect. The inhabitants caused a certain amount of trouble by agitation under British rule, but now they recognise that under it they were far more prosperous that under France or Spain, and would welcome it back.

Any small revenue lost to Spain in Minorca would be amply replaced by the increased tobacco revenue which the Spanish customs would receive with Gibraltar under their control. The smuggling question is a very sore point with the Spanish government. The Rock forms a natural depôt whence the Spaniard coming in to work by day and leaving at night, smuggles tobacco in large and small quantities. It has been stated that Gibraltar imports twenty times more tobacco than it smokes. If this be true (and no doubt it is believed by the Spaniard), he has a just cause for complaint.

This proposed exchange of Gibraltar for other territory is one of old standing, having been proposed by several Ministries. As far back as 1757, Pitt proposed its restoration to Spain in exchange for Minorca. No doubt that great statesman saw that, from one point of view, Gibraltar is a weakness to Great Britain. It is the bait which could be held out to Spain by any Power wishing to induce her to join an alliance against us. Spain may not appear to be a very favourable antagonist at present, but the use of the ports of Ferrol and Cartagena would be of great assistance to the alliance.

To sum up, the advantages to be gained by the exchange would be:—

1. A superior strategical position in the Mediterranean.
2. The provision of docks in a secure position at Port Mahon, at less cost than in Gibraltar.
3. More friendly relations with Spain.

NAVAL NOTES.

HOME.—The following are the principal appointments which have been made: Captains—G. Neville, M.V.O., to "Mars"; T. MacGill, C.B., to "Royal Sovereign"; H. W. Savory to "Hawke"; F. C. B. Bridgeman to "Drake"; T. Y. Great to "Æolus"; R. H. Bacon, D.S.O., to "Latona," as Inspecting Captain of Submarine Boats; H. D. Barry to "Duke of Wellington"; C. G. F. Cradock, C.B., to "Bacchante." Commanders—E. G. Davey to "Mohawk," and then to "Scout"; E. F. Gaunt, C.M.G., to "Mohawk"; I. R. Grant to "Clyde"; H. C. Da Costa to "Pylades"; M. Singer to "Prometheus"; O. De Brock to "Alacrity"; E. Lees to "Hayard"; H. L. D. Pearce to "Odin"; D. R. L. Nicholson to "Calliope."

The first-class armoured cruiser "Bacchante," which commissioned at Chatham on the 25th November, left Sheerness for her station on the 10th ult., where she has since relieved the first-class cruiser "Andromeda," as flag-ship of Rear-Admiral Sir Baldwin Wake Walker, C.M.G., in command of the Cruiser Division of the Mediterranean Fleet. The "Andromeda," having been relieved, arrived at Portsmouth on the 29th ult., where she will pay off; before coming into harbour she made a most successful paying off steam trial, and although her bottom was foul, the ship not having been in dock for eighteen months, she made 21·4 knots, or almost a knot in excess of the speed attained on her contract trials. The first-class battle-ship "Hood" paid off at Devonport from the Mediterranean on the 5th ult., and Captain R. S. Lowry, her late commander, immediately took up his new appointment as Captain-in-Charge of the Engineer Training College at Devonport. The second-class cruiser "Thetis" left Sheerness on the 14th ult. for China, where she relieves the "Arethusa." The second-class cruiser "Venus" commissioned at Portsmouth on the 13th inst. to relieve the first-class belted cruiser "Australia" as guard-ship in Southampton Water. The first-class cruiser "Hawke" commissioned at Chatham on the 13th ult. for relief service, and she will convey to Malta new crews for the third-class cruiser "Pyramus," the torpedo-gunboats "Dryad" and "Speedy," and the special-service vessel "Imogene." The third-class cruiser "Barham" from the Mediterranean paid off on the 6th ult. at Portsmouth. The new first-class armoured cruiser "Drake," a sister ship to the "Good Hope," commissioned on 13th inst. at Portsmouth for service with the Home Cruiser Squadron, in which she relieves the second-class cruiser "Juno."

Cruise of the "Good Hope."—The "Good Hope," which left Suez on the morning of the 8th ult., passed Aden on the morning of the 11th ult., arriving off Mombasa on the 15th ult.; having landed the Colonial Secretary, she proceeded the same afternoon to Zanzibar to coal, where she arrived the same evening. Re-embarking Mr. Chamberlain on the 21st, she left for Durban, and arrived early on the 26th ult. in the roadstead of Port Natal. From the time of leaving Suez the engines seem to have given no more trouble, and a speed of 17·5 knots appears to have been easily maintained. Although the depth of water in Port Mombasa and the channel leading to it is ample for a vessel of the "Good Hope's" draught, yet the

harbour is so narrow that it would have been impossible to turn a ship of her great length in it. Moreover, on turning into the narrow part of the channel from the outer roadstead, there are often strong tide races, which necessitate the most careful steering, and the ship being perfectly under command, which in a vessel of the "Good Hope's" size could not be guaranteed. Much the same reasons rendered it too dangerous to attempt taking her into Port Kilindini, the fine harbour on the south-west side of Mombasa Island, where our war-ships generally lie. Although when once inside there would have been room for the ship to moor, yet the channel at the entrance is very narrow, and there are two sharp turns which have to be negotiated. The ship, therefore, had to proceed to Zanzibar, where she remained during Mr. Chamberlain's visit to the borders of Uganda.

Launch.—The London and Glasgow Engineering and Shipbuilding Company on the 16th ult. launched from their yard at Glasgow the first-class cruiser "Cumberland," of the County type. The ceremony of naming the vessel was performed by Viscountess Morpeth.

The principal dimensions of the vessel are as follows:—Length between perpendiculars, 440 feet; moulded beam, 66 feet; load draught, 24 feet 6 inches; displacement at load draught, 9,800 tons. The "Cumberland" is an armoured cruiser, protection being afforded by a 4-inch belt of hard steel between the main and the lower or protective deck, extending from the bows to the aft end of the machinery space, where it terminates against an armoured bulkhead. The armament consists of two twin 6-inch guns forward and aft in barbettes, four 6-inch guns in casemates on upper deck, and six similar guns in casemates on main deck; eight 12-pounder 12-cwt. guns, two 12-pounder 8-cwt. boat and field guns, three 3-pounder quick-firing guns, and eight Maxim guns; in addition to which the vessel is fitted with two submerged tubes, one on either side, for the discharge of 18-inch Whitehead torpedoes. The engines are to develop 22,000-I.H.P., giving a speed of 23 knots, steam being supplied by 31 Belleville boilers with economisers.

Steam Trial.—The "Kent," one of the County class of armoured cruisers, has completed her series of contract trials for the time being.

At her 30 hours' one-fifth power trial she drew 24 feet 2 inches forward and 24 feet 11 inches aft, with a pressure of 220 lbs. of steam in boilers. The vacuum was 26¾ inches starboard and 27 inches port, and the revolutions were 83·6 starboard and 84 port. The total I.H.P. was 4,632, which on a coal consumption of 1·81 lbs. per unit of power per hour, gave a speed of 14·6 knots.

At her 30 hours' run at four-fifths power she had the same draught and used the whole of her boilers with a steam pressure of 225 lbs. The vacuum was 26 inches starboard and 26·5 inches port, while the revolutions were 125·3 starboard and 125·7 port. The total I.H.P. was 16,209, but 2 inches of air pressure had to be used in the last four hours. The speed on a coal consumption of 1·83 lbs. per unit of power per hour was 20·45 knots.

At the 8 hours' full-power trial the draught was practically the same as at the two previous trials. The vessel had a steam pressure of 278 lbs. at the boilers, and the vacuum was 26¼ inches starboard and 26 inches port, while the revolutions were 141 starboard and 142·2 port. The I.H.P. was remarkably even, being 11,116 starboard and 11,133 port, or a total of 22,249, with an air pressure of only three-tenths of an inch. The coal consumption worked out at 1·89 lbs. per unit of power per hour, and the total loss of water on the trial was 20 tons. The speed, however, was only 21·7 knots, against a contract speed of 23 knots.

A proposal has been submitted to the Admiralty that the "Kent" should be sent on further trials with another type of propeller, as it is believed

that her failure to realise her stipulated speed was entirely due to the unsuitability of her present screws.

FRANCE.—The following promotion and appointments have been made: Rear-Admiral—P. F. C. Gourdon to be Vice-Admiral. Capitaines de Vaisseau—A. M. Poidloüe to "Montcalm." Capitaines de Frégate—E. J. Aubry to "Troude"; M. C. Testu de Ballincourt to "Isère"; E. Rosel to "Mousquetaire."—*Journal Officiel de la République Française.*

Vice-Admiral Gervais, the most notable of living French admirals, was retired under the age clause on the 20th December, having reached the limit of 65 years. He has held flag rank for eleven years, has three times commanded the combined fleets during the grand manœuvres, and has exercised great influence over the French Navy. Notwithstanding his years, Admiral Gervais is described as still comparatively young, both in appearance and vigour, his beard being only slightly tinged with grey, and his energy and power of work inexhaustible.

Rear-Admiral Gourdon, who has been lately in command of the cruiser division of the Squadron of the North, has been promoted to Vice-Admiral in the vacancy caused by the retirement of Vice-Admiral Gervais. Capitaine de Vaisseau A. Poidloüe has been selected for the appointment of flag-captain to Rear-Admiral Le Dô, and he will take the first-class armoured cruiser "Montcalm" out to China, and will then take over the command of the first-class protected cruiser "Châteaurenault." Capitaine de Frégate L. Jourden has been selected for the appointment of Chief of the Staff to Rear-Admiral Le Dô. The "Montcalm" is to leave Toulon about the end of the present month.

M. Pelletan, the Minister of Marine, has been taken to task by the Commission on the Budget with reference to the reduction of the crews of the Mediterranean Squadron by 1,700 men during the winter months, referred to in last month's Notes. The Committee has decided that the decision of the Minister of Marine in this matter is unacceptable, and has declared that the ships of the Mediterranean Squadron must be kept constantly complete with full crews, as formerly. It is stated that M. Pelletan has agreed to rescind the order he gave.

New Ships and Dockyard Notes.—Cherbourg.—The new first-class armoured cruiser "Kléber," constructed at Bordeaux, at the Gironde Works, arrived on the 24th ult., and will carry out her contract trials at this port simultaneously with those of her sister-ship the "Desaix," built at St. Nazaire, which arrived here for that purpose on the 16th November. The trials of both these ships were to have been carried out at Brest, but, owing to the large amount of work on hand in that yard, they have been transferred to this port. Both vessels are of the smallest type of the new armoured cruisers now building, having a displacement of only 7,700 tons, while the engines are to develop 17,100-I.H.P., giving a speed of 21 knots; the ships are sheathed, as they are intended for service on foreign stations. In view of the criticisms which have been passed on the English "County" class of armoured cruiser, with regard to what is considered their under-gunning, it may be interesting to note that the "Kléber" and her two sisters only carry eight 164-mm. (6·4-inch) Q.F. guns, four 100-mm. (3·9-inch) Q.F. guns, with sixteen small Q.F. and machine guns. The "Desaix," when ready for sea, is to replace the first-class cruiser "Tage" as flag-ship of the Atlantic Division.

The new second-class battle-ship "Henri IV." has completed her preliminary trials and is to enter immediately upon her official ones, on the conclusion of which she will join the Squadron of the North. It is now more than three years since the ship was launched, and the delay in her completion has been caused by the non-delivery at the proper time of her machinery from the Indret Foundry and her water-tube boilers by the Niclausse Company.

The division of coast-defence battle-ships is at present in the dockyard hands for repairs, etc. Rear-Admiral Péphau has temporarily transferred his flag from the "Bouvines" to the torpedo-destroyer "Cassini." The *Yacht* draws attention to the fact that there is not a single cruiser attached to this division, although it is detached from the main body of the command for many months, so that when at sea the admiral has no means of communicating anything of importance, even to the semaphore stations, unless he detaches one of the battle-ships to do it.

Torpedo-boat No. 108, which went ashore in Whitesand Bay, near Plymouth, during the night of the 13th ult., had been in tow of the "Cassini," which was taking her from this port to Brest, but broke adrift. She is one of the fifty 35-metre boats ordered in 1896; several of this class of boat, now condemned as unseaworthy through want of stability, have come to grief, notably No. 102 and No. 110, which were lost at sea with all hands. The remaining boats of this type are only used for exercise, and are considered to have no military value. No. 108 has since been refloated and towed to Brest.

A court of enquiry has been ordered on the stranding of No. 108, and Capitaine de Frégate Gauchet, of the "Cassini," has been directed to send in his report and appear personally before the Court.

Brest.—Vice-Admiral Roustan, the Maritime Prefect, has received orders that work on the three new battle-ships "Démocratie," "Justice," and "Vérité" is to be resumed.

The second-class battle-ship "Dévastation," which has been going through a thorough repair, and has received Belleville boilers fitted with economisers, in place of her old cylindrical ones, has progressed with her trials in a most satisfactory manner. With her old boilers, and her engines developing 8,300-I.H.P., with 75 revolutions, the ship attained a speed of 15·1 knots; her new boilers will develop a greater I.H.P., giving a greater number of revolutions, and it is hoped that at full power she will attain a speed of 16 knots. The following results have been obtained up to the present:—With the engines developing 1,660-I.H.P., the speed was 9 knots, with a coal-consumption per I.H.P. per hour of 0·872 kg. (1·918 lbs). With 6,000-I.H.P., the speed was 14·2 knots, with a coal consumption of 0·939 kg. (2·065 lbs.). Under forced draught, but without pressing the engines or boilers, 8,460-I.H.P. was developed, with a coal consumption of 0·967 kg. (2·127 lbs.), the speed realised, however, was only 14·95 knots, which was a disappointment, but it is still hoped that at the official trial this will be materially increased.

The new armoured cruiser "Marseillaise," having had her repairs made good, has also been continuing her trials for coal consumption with the engines working at 1,800-I.H.P., and at 11,000 to 14,000-I.H.P. In her trials for the former power, the engines actually developed 2,004-I.H.P., with a coal consumption of 1·28 lbs. per H.P. per hour; with the engines developing 14,000-I.H.P., under natural draught, a speed of 18·5 knots was easily maintained, with a coal consumption of 1·35 lbs. per I.H.P. per hour.

Lorient.—The new first-class cruiser "Jurien de la Gravière" is to be commissioned this month, although it can hardly be said that her trials

have been satisfactory. The new armoured cruiser "Gloire" is also to commission this month for her trials. With regard to the "Condé," a sister ship, 800 men are now employed upon her, and the turrets for her 16·4-cm. guns, each weighing 32 tons, have been put in position; in view of the straining of the after part of the hulls of the "Marseillaise" and "Admiral Gueydon" during their trials, the necessary steps are being taken to stiffen the hull of the "Condé," where the signs of weakness appeared in the other ships, but it is hoped she will be ready to commence her trials by next June. The "Admiral Gueydon" has recommenced her trials; with the engines developing 14,000-I.H.P., under natural draught, a speed of 18·4 knots was obtained with a coal consumption of 0·782 kg. (1·72 lbs.), the contract consumption allowed being 0·790 kg. (1·738 lbs.).

It is now decided that the third-class cruiser "Lavoisier" will commission in March as the senior officer's ship of the Newfoundland Fishery Division, in place of the second-class cruiser "Isly," which is undergoing a thorough repair and receiving new boilers.

Toulon.—The first-class armoured cruiser "Montcalm" commissioned on the 5th inst. for service in China; all the officers who are being embarked on board her will only serve two years before being relieved.

The new first-class armoured cruiser "Jeanne d'Arc" has made another trial; with her engines developing 20,600-I.H.P., and making 121 revolutions, a speed of 19·9 knots was maintained, with a coal consumption of 0·699 kg. (1·537 lbs.).

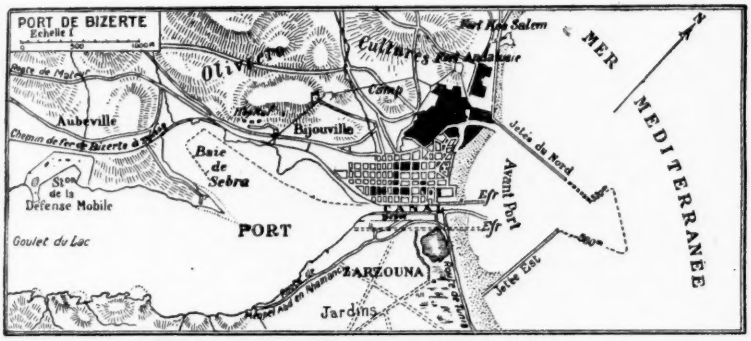
Bizerta.—The geographical value of Bizerta, from the point of view of our defence in the Mediterranean is known to everyone; its topographical value is less known. The lake offers perfect security to the naval forces that may use it for a revictualling base, but it is none the less a lake some distance from the sea, the access to which is by a narrow canal, in which currents up to 5 knots run, presenting difficulties and causing considerable delays to the entry of a naval force. Actually the entry and departure of vessels have to be effected separately, a ship not entering the canal until her predecessor signals that she has completely passed through. Above all things it became necessary to try and remedy this serious inconvenience, which is chiefly due to the narrowness of the canal as at first constructed. The canal was intended to accommodate a mercantile and not a military port, and it is only 100 metres (328 feet) wide on the surface, and not more than 60 metres (196 feet) wide at the bottom. This is insufficient for large battle-ships having 22 metres (72 feet) beam, also to its narrow dimensions is attributed the force of the current caused by the tides, and which the arrangement of the breakwaters which cover the entrance to the canal seem to favour. The programme of the new works, therefore comprise the widening of the canal and a considerable modification of the outer port.

The small plan which we give allows the works now in progress to be seen.

The dotted lines show the proposed alterations which consist in a prolongation of the northern breakwater of 200 metres (656 feet), and the construction of a separate breakwater 700 metres (765 yards) long outside the existing ones, and the widening of the canal by taking in a strip of ground 140 metres (459 feet) wide, on the side opposite to the town, and the construction of a jetty prolonging the new bank of the canal in place of the former jetty, which will be removed.

These works are well advanced, the prolongation of the northern breakwater is finished, and the new breakwater, which will protect the outer port from the N.E. winds, already shows above water for a portion of

its length; the jetty on the right bank of the canal is finished, and the canal is enlarged to the new limit for more than half its length, nevertheless the widening of the canal entails difficulties of a special nature. Communication from one bank to the other is effected by a transporter, hung to a wagon running on rails on a flying bridge 50 metres high, so as to allow vessels to pass underneath without striking their masts. This flying bridge is supported by two great lattice girder pillars, the objection to which, from a military point of view, is that they indicate from a considerable distance the entry to the port, and allow the position of the arsenal to be fixed from seawards. These reasons were sufficient to condemn the transporter, but it is necessary to provide a substitute. We believe that an ordinary floating bridge, worked by chains, is contemplated, but the inhabitants of Bizerta seem to have a marked preference for a tunnel passing under the canal. This tunnel will have to be at least 15 metres (49 feet) underground, necessitating a long cutting if an incline of 1 in 33 is not exceeded, which will make the work expensive.



The buildings for the installation of the *Défense-Mobile*, in Sans Nom Bay, may be considered complete. During the past two years the little bay has been deepened and embanked, and furnished with quays and stages. The Admiralty House has been built, and quarters for the officers and barracks for the crews have been constructed, and a submarine vessel station organised.

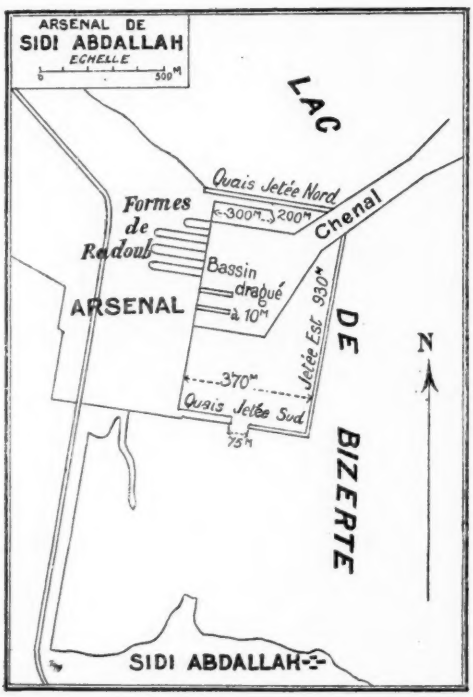
Still greater activity has been displayed in the construction of the arsenal at Sidi-Abdallah.

Two years ago the ground on which the arsenal is now rising into shape had been hardly levelled, and the irregular shore-line was untouched, and only one of the dry docks had been commenced. Now the buildings are nearly finished, the enclosing wall is completed, and one feels that the arsenal will soon be full of life.

According to the Government plans, the arsenal is to be capable of sheltering, repairing and revictualling a naval force of six battle-ships and six cruisers. The works consist of an enclosed basin of 50 hectares (123¾ acres), the surrounding quays being capable of berthing four battle-ships at the same time, and furnished with lines of rails for facilitating the embarkation of provisions, coal, and gunnery stores in the shortest possible time.

The arsenal is divided into different sections :—1. Consumable stores. 2. Ordnance stores. 3. Repairs. 4. Management. To the south is the submarine defence store, next come provisions, then the coal store to

contain 25,000 tons, and, lastly, docking and repairs and pumping machinery. The two first sections are nearly complete and contain most of their stores; the repairing workshops and dry docks are not so forward; two of the docks, 200 metres long, are in course of construction, one has been excavated and is now receiving its masonry lining, excavators are still at work on the second. If nothing unforeseen occurs, the first dock will be ready for use in about twelve months. Powerful pumps will be provided so that a vessel may be able to go in and out of dock in twenty-four hours. We may also mention that a water tower, holding 500 tons, has been built, and water laid on throughout the arsenal.



A short distance from the arsenal are in course of construction various buildings, such as a hospital, barracks, and officers' quarters, etc., which, when completed, will constitute a small town and the seat of a maritime prefecture. The only buildings at present finished are the barracks and hospital, the former will accommodate 1,200 men, and the latter will contain 300 beds for sick or wounded. A reservoir for fresh water is constructed, and a nursery garden in course of formation, to ascertain by experiment the most suitable kind of trees to plant on the somewhat sterile ground for the sake of shade and to purify the air.

Following the coast-line of the bay towards the N.W., and beyond the military town, we come to the powder magazine, shell stores, and stores for other explosives, which have been placed at a secure distance from the arsenal. A small pier has been run out here, on which rails have been

laid, and boats and lighters can come alongside and receive powder and shell for the fleet.

Such is a brief account of the works, which are being carried out by the Navy, and will in three or four years be completed. We shall then possess two formidable ports in the Mediterranean—Toulon and Bizerta.

—*Le Yacht* and *Le Temps.*

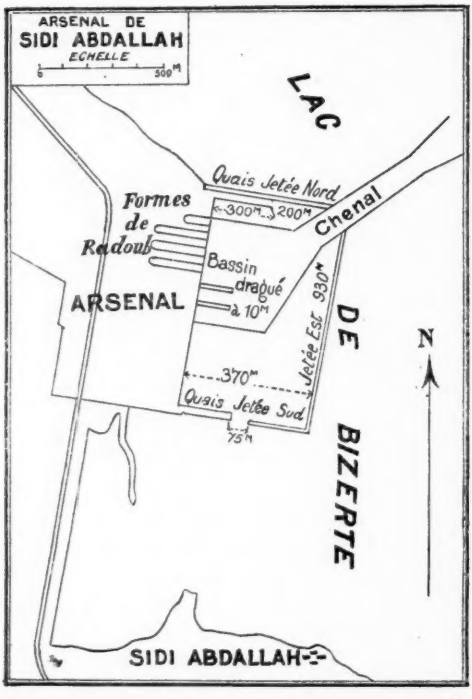
GERMANY.—The following are the principal appointments which have been made: Kapitäns zur See—Scheder to be Commodore in command of the South American Cruiser Division; Stein to "Wittelsbach; Lilie to be Inspector of the West Schleswig-Holstein Coast Division.—*Marineverordnungsblatt.*

Mishap to the "Wittelsbach."—On the 16th ult. the new first-class battle-ship "Wittelsbach" went ashore during a fog at Holskov Odde, in the Great Belt, somewhat to the North of Korsör Harbour. The ship was on her way from Wilhelmshaven to Kiel, and had only recently been commissioned for her trials; in spite of the fog on entering the Great Belt, her commander determined to proceed; but unfortunately the strong current took her on to the Holskover Bank, and, although only steaming at a low speed, she grounded so firmly that even at high water it was impossible to float her. A message was immediately sent to Kiel for assistance, and the first-class cruiser "Prinz Heinrich" arrived the next morning and attempted to tow her off, but failed. In the afternoon the first-class battle-ship "Kaiser Wilhelm der Grosse" arrived, and another fruitless attempt was made to tow her off. Lighters soon arrived from Kiel, and the work of lightening the ship was immediately proceeded with, and she was eventually towed off by the two large ships on the morning of the 20th ult; the ship proceeded to Kiel and was immediately placed in dock, and the plates of her hull on the starboard side in line with the bridge are badly bent, her rudder damaged, and starboard screw rendered useless.

Launches.—The new first-class battle-ship "Braunschweig" was launched from the Germania Yard at Kiel on the 20th ult., the naming ceremony being performed by H.R.H. Prince Albrecht of Prussia, the Regent of Brunswick. Her dimensions are as follows:—Length between perpendiculars, 400 feet; beam, 73 feet; displacement, 13,200 tons, on a mean draught of 25 feet. The "Braunschweig" and her sisters are improved "Wittelsbachs," and will be by far the largest ships yet built for the German Navy, as they have 1,400 tons more displacement than their predecessors. The most noticeable fact about the new ships is that the German designers are giving up some of the principal characteristics of their earlier ships, and in their latest designs are approximating more nearly to the designs of English battle-ships. The principal changes are as follows:—Substitution of 11-inch for 9·4-inch guns as the heavy armament; substitution of fourteen 6·7-inch guns for eighteen 6-inch; removal of the two forward 6-inch guns from under the heavy forward turret guns; extension of the main deck battery side armour round to meet barbette armour, thus making a complete armoured redoubt; giving up the heavy end-on fire, which has been so marked a feature in German ships.

Protection is afforded by a complete water-line armoured belt of Krupp steel, 9 inches in thickness, between the barbettes, and then tapering to 4 inches forward and aft; above this again is a belt of 6-inch steel, seven feet high, and above this again is a central battery, some 150 feet long, also protected by 6-inch armour, reaching to the level of the upper deck, for the secondary armament. There is a 3-inch armoured

contain 25,000 tons, and, lastly, docking and repairs and pumping machinery. The two first sections are nearly complete and contain most of their stores; the repairing workshops and dry docks are not so forward; two of the docks, 200 metres long, are in course of construction, one has been excavated and is now receiving its masonry lining, excavators are still at work on the second. If nothing unforeseen occurs, the first dock will be ready for use in about twelve months. Powerful pumps will be provided so that a vessel may be able to go in and out of dock in twenty-four hours. We may also mention that a water tower, holding 500 tons, has been built, and water laid on throughout the arsenal.



A short distance from the arsenal are in course of construction various buildings, such as a hospital, barracks, and officers' quarters, etc., which, when completed, will constitute a small town and the seat of a maritime prefecture. The only buildings at present finished are the barracks and hospital, the former will accommodate 1,200 men, and the latter will contain 300 beds for sick or wounded. A reservoir for fresh water is constructed, and a nursery garden in course of formation, to ascertain by experiment the most suitable kind of trees to plant on the somewhat sterile ground for the sake of shade and to purify the air.

Following the coast-line of the bay towards the N.W., and beyond the military town, we come to the powder magazine, shell stores, and stores for other explosives, which have been placed at a secure distance from the arsenal. A small pier has been run out here, on which rails have been

laid, and boats and lighters can come alongside and receive powder and shell for the fleet.

Such is a brief account of the works, which are being carried out by the Navy, and will in three or four years be completed. We shall then possess two formidable ports in the Mediterranean—Toulon and Bizerta.

—*Le Yacht* and *Le Temps*.

GERMANY.—The following are the principal appointments which have been made: Kapitäns zur See—Scheder to be Commodore in command of the South American Cruiser Division; Stein to "Wittelsbach; Lilie to be Inspector of the West Schleswig-Holstein Coast Division.—*Marineverordnungsblatt*.

Mishap to the "Wittelsbach."—On the 16th ult. the new first-class battle-ship "Wittelsbach" went ashore during a fog at Holskov Odde, in the Great Belt, somewhat to the North of Korsör Harbour. The ship was on her way from Wilhelmshaven to Kiel, and had only recently been commissioned for her trials; in spite of the fog on entering the Great Belt, her commander determined to proceed; but unfortunately the strong current took her on to the Holskover Bank, and, although only steaming at a low speed, she grounded so firmly that even at high water it was impossible to float her. A message was immediately sent to Kiel for assistance, and the first-class cruiser "Prinz Heinrich" arrived the next morning and attempted to tow her off, but failed. In the afternoon the first-class battle-ship "Kaiser Wilhelm der Grosse" arrived, and another fruitless attempt was made to tow her off. Lighters soon arrived from Kiel, and the work of lightening the ship was immediately proceeded with, and she was eventually towed off by the two large ships on the morning of the 20th ult; the ship proceeded to Kiel and was immediately placed in dock, and the plates of her hull on the starboard side in line with the bridge are badly bent, her rudder damaged, and starboard screw rendered useless.

Launches.—The new first-class battle-ship "Braunschweig" was launched from the Germania Yard at Kiel on the 20th ult., the naming ceremony being performed by H.R.H. Prince Albrecht of Prussia, the Regent of Brunswick. Her dimensions are as follows:—Length between perpendiculars, 400 feet; beam, 73 feet; displacement, 13,200 tons, on a mean draught of 25 feet. The "Braunschweig" and her sisters are improved "Wittelsbachs," and will be by far the largest ships yet built for the German Navy, as they have 1,400 tons more displacement than their predecessors. The most noticeable fact about the new ships is that the German designers are giving up some of the principal characteristics of their earlier ships, and in their latest designs are approximating more nearly to the designs of English battle-ships. The principal changes are as follows:—Substitution of 11-inch for 9·4-inch guns as the heavy armament; substitution of fourteen 6·7-inch guns for eighteen 6-inch; removal of the two forward 6-inch guns from under the heavy forward turret guns; extension of the main deck battery side armour round to meet barbette armour, thus making a complete armoured redoubt; giving up the heavy end-on fire, which has been so marked a feature in German ships.

Protection is afforded by a complete water-line armoured belt of Krupp steel, 9 inches in thickness, between the barbettes, and then tapering to 4 inches forward and aft; above this again is a belt of 6-inch steel, seven feet high, and above this again is a central battery, some 150 feet long, also protected by 6-inch armour, reaching to the level of the upper deck, for the secondary armament. There is a 3-inch armoured

deck and a 1·6-inch splinter deck. Along the lower deck, rising right up to the bow, cellulose is worked.

The armament consists of four 11-inch guns mounted in pairs in turrets, one forward and one aft, protected by 10-inch armour, with 10-inch bases; fourteen 6·7-inch Q.F. guns, ten in the main deck battery, and four in case mates on the upper deck, all protected by 6-inch armour, four of which can be used for end-on fire; twelve 20-pounders, distributed over various parts of the ship, with twelve 1-pounders, and five submerged torpedo-tubes, one in the stern and two on each beam. There is also one above-water tube in the stern, protected by armour. The whole weight of armour carried is 4,200 tons. The engines are to develop 16,000-I.H.P., giving a speed of 18 knots, steam being supplied by eight water-tube boilers on the Thornycroft-Schultz system, and six cylindrical boilers of the old pattern. The normal coal supply is 700 tons, with 200 tons oil; the maximum, 900 tons. It was originally intended that the ships should have a speed of 19 knots, but this had to be given up, as on the displacement in view of the amount of armour carried, it was not found possible to provide engines and boiler power sufficient for so high a rate of speed. The most noticeable point about these ships is the weight of armour they carry in proportion to their displacement as compared to English ships. They are only some 250 tons larger than the "Canopus" class, but in armour protection, if not in armament, they are far superior. The total weight of the armour of the "Canopus" class is only 1,700 tons, that of the new German ships 4,200, according to the *Engineer*, and it would certainly be interesting to know what there is in the construction of the ships to make the difference, for the extra coal supply of the "Canopus" class will not account for it. The only presumption is that the "Canopus" class are infinitely stronger built than the German ships, which is probably the case when it is re-called how the outer bottom of the "Kaiser Friedrich III." collapsed and her inner bottom was seriously damaged, when she ran ashore on the Adlergrund shoal some months ago.

On the 11th ult. the third-class cruiser "Undine" was launched from the Howaldt Yard, Kiel. She is a sister vessel to the "Amazone" and her six sisters, her dimensions being as follows:—Length, 328 feet; beam, 38 feet 7 inches; displacement, 2,655 tons, with a draught of 16 feet. The engines are to develop 8,000-I.H.P., giving a speed of 22 knots, the boilers being of the Thornycroft-Schultz type. The armament consists of ten 4·1-inch Q.F. guns, with ten 1·4-inch, and four machine guns, and two submerged torpedo-tubes.—*Neue Preussische Kreuz-Zeitung, etc.*

German Naval Manœuvres (continued from p. 1613, December JOURNAL, *and concluded).*—On Sunday 24th, the fleet being at anchor off Neufahrwasser, the annual regatta between the cutters of the fleet took place, the two first prizes, which were presented by the Kaiser, being carried off by the boats of the temporary flagship of the Commander-in-Chief, the "Kaiser Wilhelm II." The principal prize, a silver crowned eagle, is carried during the ensuing twelve months on the stem of the winning boat, while the two crews were given a dinner by the officers. During the ensuing week, up to Friday the 29th, the fleet weighed each day about 8 a.m., and steaming out to sea, were exercised during the forenoon and afternoon at tactical exercises and battle formations, anchoring again about 6.30 p.m. At dusk the ships weighed again and stood out with no lights showing, so as to give the torpedo-boat flotillas exercise in attacking, anchoring again about midnight; but on the evening of the 26th, the fleet remained at anchor in single line off Edingen,

no lights being allowed to show after dark. The torpedo-boats, when attacking, were ordered on this occasion to use torpedoes with collapsible heads, instead of, as heretofore, merely signalling when they were in a position to fire. The night was dark, which, if it made it difficult for the boats to discover the position of the ships, made it equally difficult for the ships to detect them. The attack seems to have been carried out with much dash and success by the boats, the "Kaiser Wilhelm II." being struck fairly amidships by one torpedo, while more than one of the other ships were also struck.

The tactical exercises during the week seem to have proved conclusively that the ships of the II. Squadron, consisting of the "Sachsen" and "Hagen" classes, are but of small tactical value in the line of battle. Even in manœuvre exercises their low speed made it difficult to count them of the same value as the modern ships; and although the lengthening of the "Hagen" class has added to their coal endurance, it has not added to their fighting value. On Friday forenoon the fleet anchored off Neufahrwasser, and that afternoon and Saturday were spent in coaling ship, the "Kaiser Wilhelm II." taking in 650 tons in three and a half hours.

On Sunday morning, 31st August, the fleet weighed and proceeded towards the Great Belt, *en route* to the North Sea, during the passage to which a strategical operation, extending over some days, was carried out. The general idea was as follows:—Germany was engaged in a naval war, and was hard pressed in the North Sea and Baltic by a powerful enemy. The main body of the German fleet was in the North Sea, and had already encountered the enemy, with the result that one of its division of battleships, with a torpedo-boat division, had been cut off and forced eastwards so far that is was impossible for it again to unite with the rest of the fleet, as a superior force of the enemy lay between. Rear-Admiral Galster, the commander of the division, which was represented by the "Hildebrand," "Hagen," "Heimdall," and a torpedo-boat division, determined to proceed through the Cattegat and the Belt to Kiel, and from there back through the Kaiser-Wilhelm Canal, into the North Sea, and so to rejoin the main body of the fleet. But there was a strong squadron of the enemy in the Baltic off Arkona, thus close to the southern outlets of the Belt and the Sound into the Baltic, and the Admiral in command had received the information that the German division had passed Cape Skagen, steering to the south-east, and he was, moreover, so far instructed as to the general situation that he could fairly accurately guess his opponent's intentions. In order, therefore, at all costs to prevent the German commander from accomplishing his purpose, and if possible to destroy him, or at least force him back into the North Sea, he divided his fleet into three squadrons, each of which was superior to the German force, and decided to send one through the Great Belt, another through the Small Belt, and the third through the Sound northwards. Through the Sound were to go the battle-ships "Baden," "Württemberg," "Beowulf," the cruiser "Niobe," and a torpedo-boat division, under the command of Rear-Admiral Fritze; through the Great Belt the battle-ships "Kaiser Friedrich III.," "Kaiser Wilhelm der Grosse," "Kaiser Karl der Grosse," with the cruisers "Prinz Heinrich," "Victoria Luise," and "Freya," and a torpedo-boat division under the command of Prince Henry of Prussia; through the Small Belt the battle-ships "Brandenburg," "Weissenburg," and "Kurfürst Friedrich Wilhelm," with the cruisers "Amazon," "Nymphe," and "Hela," and a torpedo-boat division, under the command of Rear-Admiral von Prittwitz und Gaffron.

At 6 o'clock on the morning of 2nd September, each of the enemy's three squadrons was off the southern outlet of the three before-mentioned

channels, while the German force some four hours previously was steaming south from the Cattegat, but this was only known to the Commander-in-Chief, who, in the "Kaiser Wilhelm II.," was steaming through the Great Belt at the head of Prince Henry's squadron, as being the best position from which he could supervise the whole field of operations.

The problem which each side had to solve was not altogether an easy one. The Belt and Sound are awkward channels for large ships of deep draught to pass through, especially during the foggy autumn months, and all the more so as the currents through them are often very strong. Numerous shoals, the marks on which are often difficult to recognise, except in perfectly clear weather, add to the difficulties of the navigation, while the large number of small islands and inlets make it almost impossible to effectually watch all the narrow channels leading off the main route. Yet this last duty was imperative; if the enemy's squadron coming up from the south was to achieve success, every bay, inlet, and channel must be examined. Strategical scouting of this kind made great demands on the captains and navigating officers of the ships, and the carrying it out was thoroughly good war training, and it was all the more difficult owing to the thick weather, which rendered navigation somewhat dangerous, while the lighter draught of the German battle-ships enabled them to pass through channels which could not be used by the enemy.

On the other hand the German Admiral had no easy duty before him, as he had to reach Kiel without, if possible, being brought to action by a superior force; and he knew that he would probably find all three channels barred by a division of the enemy stronger than himself. He had only two alternatives, either to get through unobserved and unmolested by the enemy, or else to give up his plan and get back into the open water of the north. But whichever course he took, he was much hampered by the fact that he had no scouting ships, and had to use his torpedo-boats for this duty, for which they were quite unfitted, the range of vision from them being so extremely limited, while there were so few of them that the battle-ships had to keep in close touch with them in order to learn the results of the scouting, which in itself was dangerous, as there was the risk of their being intercepted by the pursuing enemy and destroyed. After weighing all the "pros" and "cons," Rear-Admiral Galster determined to steam through the Little Belt with all his forces, and with this purpose left his anchorage off Hesseloe Island at 2 o'clock on the morning of the 2nd September.

At 6 o'clock on the same morning the hostile fleet divided as already reported, weighed, and stood to the north. The weather was on the whole favourable as far as the Great Belt was concerned, although a certain amount of fog lay near the coast and among the islands, which more or less obscured the smaller channels. The widely extended lines of cruisers and torpedo-boats were sent ahead, and carefully searched the bays and adjacent channels without finding any trace of their opponents, and it soon became certain that they were not coming through the Great Belt. It also seemed unlikely that they would attempt the Sound, which is a long, narrow channel, through which it would be almost impossible for a vessel to pass unperceived. To make sure it was, however, necessary to close it with a squadron, which was done without a second thought, in view of the inferiority of the German fleet to each section of the enemy's, even when so broken up. Towards midday the commander-in-chief in his flag-ship passed close to a Danish squadron at anchor, consisting of four ironclads and some torpedo-boats. Salutes were exchanged and also greetings by means of the International Code of signals. It was late in the afternoon when one of the scouting ships of the

division, which had been watching the Little Belt, appeared to the north of that channel and signalled that the enemy was in sight, but was standing back again to the north. The squadron coming out of the Great Belt was too far off to sight the enemy, so pursuit was not possible, while matters were complicated by the fact that the Little Belt squadron ran into so dense a fog that it became not only objectless, but dangerous for battle-ships of deep draught to move; so the commander of the division came to anchor with them, sending, however, the cruisers and torpedo-boats on to scout for the enemy, with whose torpedo-boats they soon came in touch, bringing them under so heavy a fire that several were soon put out of action. On this the German squadron altered course and steamed back towards the north, followed by the hostile cruisers; and, although for the time successful in avoiding battle with a superior force, yet the Admiral had also for the time failed in his object of reaching Kiel. In the evening the three squadrons of the enemy effected a junction, and the pursuit of the German ships was continued through the Cattegat. The breadth of the channel, however, and the more or less continued thick weather made a thorough barring of it almost impossible, and Rear-Admiral Galster, once more altering course, succeeded in passing unobserved through the advanced chain of hostile cruisers, getting so far to the south before he was seen that there was no possibility of the battle-ships overtaking him.

On the night of the 3rd-4th September the whole fleet anchored off Läsö Island, not far from Aalborg Bay, in order to give the men, especially the crews of the torpedo-boats, a quiet night. On the morning of the 4th the strategic manœuvres were resumed, the scheme being as follows:—The German squadron, which had been steadily pressed back to the north, had, however, in the Skagerrack been reinforced from the main body of their supposed fleet in the North Sea, by three battle-ships, the "Baden," "Württemberg," and "Beowulf," the armoured cruiser "Prinz Heinrich," and another torpedo-boat division, and Rear-Admiral Galster had now to make an attempt to round Cape Skagen, and by the North Sea reach the shelter of Heligoland. On the enemy again lay the duty of forcing the German squadron to fight and destroying it. In order to make the operations of real value the German ships were given some hours' start, in order that their commander could formulate his plans out of sight of his opponents. The speed of his squadron was, however, taken as inferior to that of the enemy, so that the latter might have the opportunity of overtaking him. Admiral Koester, in the "Kaiser Wilhelm II.," weighed at the same time as the German squadron, and this time attached himself to it.

During the afternoon several of the enemy's cruisers and torpedo-boats were observed from the German squadron at different points on the horizon. They, however, kept well out of range, contenting themselves with merely keeping in touch. The "Prinz Heinrich," the only cruiser on the German side, was immediately ordered to attack some of the hostile cruisers, forcing them either to fall back or be put out of action, and for some time she maintained a brisk fight with the "Freya" and "Victoria Luise," which, as they were unarmoured, was given in favour of the "Prinz Heinrich" by the umpires, although her speed was considered much reduced for some hours, one of her engines being supposed to have been damaged by a shell. The night did not pass quietly. About 2 a.m. the enemy's torpedo-boats, which since night fell had ventured close, attacked the squadron. The admiral at the last moment, by a rapid change of course, sought to avoid the attack, while the boats brought under the search-lights were subjected to a heavy fire. In actual warfare, many of the boats must have been destroyed; but, on the other hand, the attack by the boats was carried

out with great skill and dash, and the probabilities are it would have been attended by a certain amount of success. Still, only actual war experience will show what the measure of success is that would attend these attacks, but they have their uses in manœuvres. Among other things, it is possible to judge how far the search-lights are effective. When day broke the enemy were in full view coming up astern, but Heligoland was also close, and although a heavy fire was opened on the German squadron, it was impossible to prevent it from reaching the desired shelter; and about mid-day the whole fleet was anchored off the island.

During the last-mentioned strategical manœuvres every opportunity was taken of testing the value of wireless telegraphy, and exercising the ships in its use. All the ships of the manœuvre fleet, with the exception of the torpedo-vessels, were fitted on the Slaby-Arco system, and as far as possible fully instructed telegraphists were appointed to every ship, as the apparatus was continually in use. There being an idea that the only use for wireless telegraphy is as a means of communication between ships far apart from each other, it is as well to point out that this system was in daily use between the ships of the squadron, and showed that it would be difficult to find a more rapid or more convenient form of communication between the admiral and his subordinates. But its means questions were settled in the shortest possible time, which would ordinarily have involved long correspondence, and perhaps rendered the transmission of an answer by a despatch vessel necessary. Flag signals are, of course, still necessary where rapid changes in manœuvring the fleet have to be carried out. During the operations which had been carried out, the Commander-in-Chief continually steamed from squadron to squadron, following the course of events, and was with one or two exceptions kept fully in touch by wireless telegraphy with all that was going on elsewhere. These exceptions, moreover, were due to influences, which at present it is impossible to combat successfully, in particular to the presence of electricity in the atmosphere. It is not necessary for a thunderstorm to break to render ineffective the working of wireless telegraphy, for with a warm, dry air it by no means follows that messages can be transmitted with certainty; and experience shows that the damper and cooler the air is, the more favourable are the conditions for its effective use. This is a fault, common to all systems, which demands earnest attention on the part of scientific men. Great care must also be taken with the training of the telegraph *personnel*, as experience shows that a thorough practical training, in addition to theoretical knowledge is necessary in order to obtain the best results from the apparatus; and as such a staff cannot be improvised, the necessary steps must be taken to develop this branch of the Service.

From the 8th to the 11th September the fleet were exercised every day at steam tactics, anchoring off Heligoland for the night, and at Wilhelmshaven on the evening of the 11th; on the 12th and 13th the ships coaled.

On Sunday, the 14th, the fleet again put to sea for the last great strategical exercise, at which His Majesty the Kaiser was present. The general idea of the operations was as follows:—The fortune of a naval war in which Germany was engaged had gone against her. In the last decisive battle in the North Sea the German fleet was defeated, four battle-ships only escaping, for which, with the cruisers and torpedo-boats remaining, the only chance left was to withdraw from the high sea, and, in conjunction with the coast batteries, make a last desperate stand. The German commander was under no delusion as to what the further aims of the enemy were, and being unable to make any general opposition, he determines to restrict

himself to the most important object, which was the protection of the mouth of the Elbe, the Kaiser-Wilhelm Canal, and Hamburg.

The defending force consisted of the four battle-ships "Baden" "Württemberg," "Beowulf," and "Brandenburg," a force whose fighting value was much diminished by its want of homogeneity, and there were in addition the second-class cruiser "Freya," the third-class cruiser "Hela," and the torpedo-boat divisions, the boats forming which, however, were not all present, as at the decisive action they were dispersed, and several were still in the North Sea.

The enemy's force consisted of the battle-ships "Kaiser Friedrich III.," "Kaiser Barbarossa," "Kaiser Wilhelm der Grosse," "Kaiser Karl der Grosse," "Weissenburg," "Kurfürst Friedrich Wilhelm," "Heimdall," "Hagen," and "Hildebrand," with the cruisers "Prinz Heinrich," "Victoria Luise," "Amazone," "Niobe," "Nymphe," and "Zieten," the last-named vessel having no fighting value, although a fictitious value was attached to her for manœuvre purposes; there were also in addition a torpedo-boat division and the hospital-ship "Hansa"; this fleet was under the orders of Prince Henry of Prussia, and the defending fleet under Rear-Admiral Fritze.

Hostilities began on the 15th September, and on that morning the enemy was to the west of Heligoland, but out of range of the guns of that still unreduced fortress; nevertheless, he had command of the rest of the North Sea; and as he knew where the German fleet had withdrawn itself, and that no other force could come to its assistance, he was able at his leisure to take the necessary steps for hermetically sealing the mouth of the rivers, destroying the torpedo-boats, while also blockading the German North Sea harbours. Accordingly the 15th September found the mouths of the Jade, Weser, and Elbe barred by cruisers, which also, as regards the Elbe, had to watch the defending fleet shut up there. The nine battle-ships and some of the cruisers steamed first to the mouth of the Ems, in order to capture Borkum Island and its garrison, then blockade the Ems, and strangle the trade of the flourishing town of Emden. The battle-ships divided themselves when off Borkum in order to subject the island to a bombardment from two sides. The guns of the works were soon silenced, and the weak garrison, the strength of which the enemy had overrated, was reduced to a position of being able only to offer a very weak resistance to the force landed from the ships, which, anchoring off the lightship after the bombardment, had immediately landed their small arm companies. By taking possession of the island the enemy was able to cut the sea cables, thus cutting Germany off from all oversea communications. Towards evening the battle-ships left Borkum and steamed towards the mouth of the Elbe, leaving some of the light cruisers to blockade the Ems. From the different blockading squadrons satisfactory reports were also received; the cruisers had not been attacked by any of the defending forces, and had been able to devote themselves entirely to the work of making the blockade effective, and it was now possible to collect all the available forces off the mouth of the Elbe. It was soon discovered that the German battle-ships were lying well out in the stream, with the few remaining cruisers and torpedo-boats pushed forward to the mouth of the river on the look-out. This was the position at the end of the first day; the weather was bad; a strong north-westerly wind blowing, with a high sea, overcast sky, and passing showers. Towards evening Admiral von Koester arrived in the "Kaiser Wilhelm II.," so that he could exercise from here a general surveillance over the whole field of operations.

Nothing of importance seems to have occurred during the 16th, but on the night of the 16-17th the German torpedo-boats succeeded in putting one of

the enemy's cruisers out of action, and severely damaging another. At daybreak the blockading battle-ships, which during the night had kept well out at sea as a precaution against torpedo-boat attacks, steamed in again towards the mouth of the river, and, after reconnoitring the Channel and obstructions, opened fire upon the fort, while the cruisers on both sides exchanged shots, but the "Prinz Heinrich" soon forced the German ones to take shelter. The wind increasing to a gale, with heavy rain-squalls, and a high sea running straight into the mouth of the river, the outlook was so unfavourable that there can be no doubt that in actual warfare an enemy would have awaited a more favourable moment for attack, as the delay, so long as the blockade was strictly maintained, would not have affected the trend of events. The torpedo-boats off the mouth of the Elbe had a very bad time of it, but behaved well. Unfortunately a petty officer on board "D 9" was thrown by a heavy sea with such force against a gun that he died shortly afterwards on board the hospital-ship.

In view of the unfavourable state of the weather, the Kaiser, who had arrived on board the "Hohenzollern," directed that the operations should be postponed until the next morning, and that both sides should remain quiet for the day. This decision was communicated with extraordinary rapidity by wireless telegraphy to all the widely separated ships, and the blockading fleet anchored for the night off Heligoland, the "Hohenzollern" anchoring in the mouth of the river.

At daybreak the enemy's fleet weighed and stood in towards the mouth of the Elbe for the decisive struggle. It was necessary first to destroy, or at least silence the forts at the mouth of the Elbe before the ships could safely attempt to enter the river; but after a heavy bombardment of some hours, the admiral determined to force the passage at all hazards, and the ships, at full speed, still maintaining a heavy fire, passed the last fortifications. At this moment the German squadron, supported by the torpedo-boats, made a desperate attack, and succeeded in putting two of the enemy's fleet out of action, but the enemy was so superior in force that the victory was declared to remain with him, and so the manœuvres came to an end. The last decisive action took place not far from where the Imperial yacht had anchored, and the fleet steamed past her at the conclusion of the battle on their way to the anchorage off Altenbruch. In spite of the heavy squalls, accompanied as they were by drenching rain, the Kaiser remained the whole time of the action on the upper bridge of the "Hohenzollern" watching the course of the fight, while the yacht kept under way the better to observe the whole field of action.

The last day's operations afforded a good opportunity for testing the training of the fleet, as the navigation of such a winding channel as the Elbe's, steaming at full speed in a gale, driving rain, and with the air, moreover, thick with powder smoke, was by no means child's play; but nevertheless the fleet was handled in close order with great precision, and when the German squadron made their attack no fewer than fourteen large ships, exclusive of the torpedo-boats, were manœuvring in these narrow waters. The torpedo-boats were also excellently handled, their attacks being favoured by the thick weather. However good practice these peace manœuvres may be for the fleet, the fact remains that they cannot set at rest the many vexed questions which trouble thoughtful officers, such as how blockading ships would be affected by the guerilla tactics of torpedo-boats; would ships destroy fortifications, or fortifications the ships, and other similar questions which only the test of war can answer. In the meantime it may be safely taken for granted that if the fleet is defeated at sea, no amount of forti-

fication will turn the scale. They may make the work of the victor harder, and increase his losses, but that is all.—*Précis from the letters of the Special Correspondent of the Neue Preussische Kreuz-Zeitung.*

UNITED STATES.—*Trial of the "Maine."*—The Board of Inspection and Survey of the Navy made its official report to the Navy Department on the trial trip of the new first-class battle-ship "Maine" on 17th September. Particular interest attached to the trial, as she is the first vessel in the U.S. Navy equipped with the French Niclausse boiler. The board reported that the "Maine" made exactly 18 knots speed, which was the requirement of the contract under which she was constructed. The recommendations governing future speed tests made by the board are of special interest. On this trial the report says :—

"The board desires to call to the attention of the Department the fact that the precept for the trial of the "Maine" called for the speed of that vessel to be determined over the course used for the trial of the "Illinois." The contract speed of the "Illinois" was 16 knots per hour, and that of the "Maine" 18 knots. As the contract calls for a continuous run lasting 4 hours, the distance required to be covered in a single run over the course was 32 knots in the case of the "Illinois" and 36 knots for the "Maine." The actual length of the course used for the trial of the "Illinois," namely, 33 knots, was, therefore, sufficient to ensure satisfactory results for the trial of that vessel, but was not of sufficient length to permit the determination of the speed of the "Maine" for the full 4 hours, and the speed of that vessel was therefore only determined, as stated above in this report, for that part of the 4 hours that the "Maine" was actually on the course. The board believes that more satisfactory results will always be obtained when this method of determining the speed is followed, if the length of the trial course is made such a distance that the vessel will require at least one half of the time of her speed trial to make a single run over the course at the contract speed. This would have made the length of the course for the trial of the "Maine" at least 36 instead of 33 knots. It is believed to be desirable to follow this principle of determining the minimum length of the course in all future trials of this character.

"The board concurs in the recommendations contained in the report of Naval Constructor J. J. Woodward, U.S.N., as to certain alterations which should be made on the "Maine" when time permits, so as to correct defects in the present arrangement of quarters; and desires to call especial attention to the very unsatisfactory condition of the "Maine" for inspection at the time of her trial, owing to the large amount of unfinished work of an important character. The undesirability of subjecting vessels to a preliminary acceptance trial when they are so far from final completion has been made the subject of repeated reports to the Department by the board. It is not believed that the time of delivery of the vessel to the Government is hastened to any appreciable extent by such action, while on the other hand the preliminary acceptance trial is simply reduced to determining the speed over the trial course, and no satisfactory opportunity is offered to determine the value of the vessel in other respects than speed, or in observing defects or deficiencies in construction, since none of the principal mechanisms that determine the military efficiency of the vessel, such as turrets, ammunition hoists, magazine fittings, etc., were so far advanced in their construction as to be capable of operation in any manner whatsoever. Under such circumstances the preliminary acceptance trial fails to realise the full intent of its purpose under the contract, and the Government loses a valuable and

necessary safeguard in determining that the contract for the construction of the vessel has been properly executed."

Concerning the trial the board says :—

"At 11 : 23·40 A.M. (75th meridian time), the "Maine" passed Station No. 1 on her official trial. After passing Station No. 6, she made a long turn of 17 minutes 48 seconds and then stood back, passing Station No. 6 on the return course at 1 : 35·32 P.M. (75th meridian time). Times of passing Stations Nos. 1 and 6, 33 nautical miles apart, are as follows (75th meridian time) :—

Run north : Station No. 1, 11 h. 23 m. 40 s. ; No. 6, 1 h. 17 m. 44 s. ; 1 h. 54 m. 4 s. Time taken in making run of 33 nautical miles over course.

Run south : Station No. 6, 1 h. 35 m. 32 s. ; Station No. 1, 5 h. 22 m. 8·5 s. ; 1 h. 46 m. 36·5 s. Time taken in making the run south over the course of 33 nautical miles.

The run north was made at a speed of 17·358 nautical miles per hour, and the run south at a speed of 18·573 miles per hour, giving a mean speed of 17·965 knots per hour for the entire run over the trial course. The applied current corrections, admitting that the stake-boats were in their proper positions, make the actual distances run through the water as follows : — Run north : 33·736 nautical miles, making the corrected speed for the run north, 17·745 knots. Run south : 32·388 nautical miles, making the corrected speed for run south, 18·228 knots.

The weather was fair during the run and clear : wind moderate from north-north-west with a light north-easterly swell. At the end of the speed trial, while the vessel was at full speed, the steering gear was tested as follows : —Helm being amidships, it was put hard-aport in 15 seconds ; while the vessel was swinging under helm hard-a-port, the helm was put hard-a-starboard, time, 20 s. conds. The diameter of turning circle was about 325 yards. The angle of heel was 2·8°. The steam steering gear was then tried with the vessel at half speed. The main engines of the vessel were reversed and the ship allowed to go astern. During this trial the steering engine worked smoothly, answering the control from the bridge rapidly, and the vessel showed remarkably good manœuvring qualities.

The stake-boats were not all in their true positions, and correcting the speed, as above determined, for the changes in the ship's course due to two of these vessels being out of position, the actual distance run on the N.E. leg was 33·786 knots, and the true speed of the "Maine" on that leg was 17·772 knots. The true mean speed was, therefore, 18 knots.

	Run North.		Run South.	
	Starboard.	Port.	Starboard.	Port.
Maximum revolutions	128·1	128·6	129·9	131·6
Average revolutions	125·5	127·25	128·5	130·38
Maximum steam pressure in boilers ...	222·0	—	227·0	—
" " " at engines...	200	200	210	210
Average steam pressure in boilers ...	—	216·0	—	—
" " " at engines ...	—	194·2	199·0	—
Maximum air pressure in fire-rooms...	—	0·31	—	0·28
Average " " " ...	—	—	0·214	—

The mean draught of the "Maine" for the 4-hour speed trial was 23 feet 6 inches. The weight of machinery as far as completed, including water in the boilers and surface condensers, etc., in accordance with Clause 10 of the contract for the "Maine," according to a statement furnished by the inspector of machinery, Commander W. S. Moore, U.S.N., is 1,549 tons.

The working of the machinery, both main and auxiliary, and the performance during the trial were in all respects satisfactory. A careful observation and inspection of various parts of the machinery, during and after the trial has shown that the engines on the whole are in excellent condition. After the completion of the trial the cover of the circulating pump engine was broken by the working loose of a nut; this part will have to be renewed. The boilers are clean and in very good condition, with the exception of the furnace door casings, which are badly warped and will have to be repaired.—*Army and Navy Journal.*

MILITARY NOTES.

PRINCIPAL APPOINTMENTS AND PROMOTIONS FOR DECEMBER, 1902.

Major-General and Hon. Lieut.-General D. C. Lord de Ros, K.P., K.C.V.O., to be Colonel of the 1st Life Guards. Lieut.-Colonel and Brevet Colonel J. W. Godfray, C.B., from h.p., to be Colonel to command the 25th Regimental District (the King's Own Scottish Borderers). Brevet Colonel C. G. Donald, C.B., from h.p., to be Colonel to command the 7th and 57th Regimental Districts (the Royal Fusiliers, City of London Regiment) and (the Duke of Cambridge's Own, Middlesex Regiment). Brevet Colonel Sir J. G. Maxwell, K.C.B., C.M.G., D.S.O., from Staff in South Africa, to be a Brigadier-General on the Staff, to be Chief Staff Officer, IIIrd Army Corps, with the substantive rank of Colonel in the Army, and to have the temporary rank of Brigadier-General whilst so employed. Lieut.-Colonel and Brevet Colonel H. A. Walsh from h.p. to be Colonel to command the 20th Regimental District (the Lancashire Fusiliers). Colonel U. G. C. de Burgh from h.p. to be an Assistant Inspector of Remounts. Colonel W. Peacocke, C.M.G., from h.p., to be Colonel on the Staff of Royal Engineers. Colonel H. E. Belfield, C.B., from h.p., to be A.A.G., Ist Army Corps. Lieut.-Colonel and Brevet Colonel G. M. Bullock, C.B., from Staff in South Africa, to be an A.A.G., with the substantive rank of Colonel in the Army. Brevet Colonel J. G. White from h.p., to be A.Q.M.G., 2nd Division Ist Army Corps. Lieut.-General Lord W. F. E. Seymour, Lieutenant of the Tower, to be General. Brevet Colonel A. W. Thorneycroft, C.B., A.A.G., 7th Division, IIIrd Army Corps, is granted the substantive rank of Colonel in the Army. Major-General G. Paton, C.M.G., to be Colonel of the South Wales Borderers. Lieut.-Colonel and Brevet Colonel S. Grant, Chief Engineer, Military Works Service, India, is granted the substantive rank of Colonel in the Army. Lieut.-Colonel and Brevet Colonel S. B. Beatson, C.B., I.S.C., Inspector-General of Imperial Service Troops, India, is granted the substantive rank of Colonel in the Army.

The Breeding in Canada of Horses for Army Use.—The following article, by J. G. Rutherford, appeared in the Halifax (U.S.) *Evening Chronicle.*—While the supply of horses suitable for military use has always, even in times of peace, been a serious question, the experience of our South African troubles has given it an importance altogether new and somewhat

startling. It has now been clearly shown that troops under modern conditions of warfare must be able to move rapidly from place to place, and that the mounted soldier has thus an immense advantage over the less mobile infantry man.

This development has led to the purchase by the British Government, during the present campaign, of a very much larger number of horses than would otherwise have been required. Nor has the lesson been learned by Britain alone; all military nations have been closely watching the operations in South Africa, and there is no room for doubt that the general demand for horses suitable for army purposes will be much greater in the future than in the past. Of the horses purchased for use in Africa the Dominion has by no means furnished her fair share, although, in addition to those taken by our own contingents, a considerable number have been picked up in Eastern Canada by Lieut.-Colonel Dent, of the Remount Department of the British Army. It is not, however, an easy matter at present to obtain in this country any large number of horses altogether suitable for army use. No encouragement to produce them has, until very recently, been shown to breeders, and there being no very active home demand for any but the very best of the sorts now asked for, they have not been bred to anything like the extent of which the country is capable. After the visit of Colonel Ravenhill in 1887, the western ranchers, in expectation of a market, went to much trouble and expense in securing and importing suitable foundation stock, and as a result were successful in producing many first-class cavalry horses. As, however, beyond a limited number taken by the North-west mounted police and a few by foreign buyers, there was no sale for them as such, the breeders have largely turned their attention to other and, under the circumstances, more profitable lines of stock.

The natural conditions in Canada are, it need hardly be said, most favourable for the production of the animals wanted, while in the event of serious international disturbance Canadian horses would always be available for imperial use, while it might be impossible to procure them in foreign countries. Again, through the medium of our great trans-continental railway, they could be shipped from either Atlantic or Pacific ports to any part of the world where they might be required.

In view of the strong probability that the demand hitherto lacking will in the future be such as to warrant the breeding in fair numbers of the horses needed for military use, a brief description of those now being sought for and purchased by the agents of the British War Office, and a few hints as to how they will be produced, will not be out of place.

They are of three fairly distinct types, as required for artillery, cavalry and mounted infantry.

At the Canadian horse show held in Toronto in April, 1900, the Dominion Government gave special prizes for each of these classes; and as Lieut.-Colonel Dent, the imperial remount officer detailed to purchase in Canada, was one of the judges, thus making the selections authoritative, a description of each first-prize animal, together with its measurements, will be appended to the general list of requirements in all three divisions.

The Artillery Horse.—The artillery horse asked for by the army buyer is really a smart, active van or express horse on short legs, with plenty of bone and substance and enough quality to ensure staying power in fairly fast work. He should stand from 15-2 to 16 hands, weigh not less than 1,300 lbs., and measure at least 8 inches below the knee and 72 inches in girth. Considerable variation in type is permissible, the work of the horse artillery demanding greater speed and therefore more warm blood than are necessary for ordinary field artillery, while in all batteries properly horsed

the rear and centre pairs are slightly taller and more rangy than the wheelers, the latter requiring greater strength and substance. The first-prize entry at Toronto last spring was of the lighter sort, being in fact the pure-bred hackney mare Cassandra. She stood 16 hands, weighed 1,325 lbs. and girthed 76 inches. She measured 8¼ inches below the knee and 20¼ inches round the arm; from crest to withers 36 inches, withers to croup 29 inches, croup to tail, an important point in all military horses, 19 inches. Although in this particular instance the prize went to a hackney, it does not, by any means, follow that gun horses should be either wholly or partly of that breed. They may be obtained by the judicious use of the thoroughbred horse on mares of size, substance and action, or by stinting good half-bred or strong roadster mares to a biggish hackney or breedy coach sire. So long as they show sufficient quality to ensure activity and endurance and at the same time meet the requirements as to size and substance, the question of pedigree is of secondary importance.

The Cavalry Horse.—The cavalry horse is of a somewhat different type, and one at present too rare in Canada, owing to the preference shown by many light horse breeders for the American trotting sire, an animal possessing but few of the qualities and characteristics of the riding horse.

Colonel Ravenhill in his report says: "A malformation in the Canadian horses which might advantageously be brought to the notice of breeders is that their quarters are short and very drooping, a serious defect in a military horse; indeed, we had to reject as unsuitable a considerable proportion on this account. This is not only a great dis-sight, but where a mounted soldier has to carry a kit on his horse's back it amounts to an insuperable objection; it has arisen from the too extensive use of the American trotter for stud purposes, this defect being very apparent in that horse. This is an additional reason for the more continuous introduction of the English thoroughbred, or such horses which are very straight in their backs and quarters, with tail set on high.

To get good cavalry horses the thoroughbred sire is almost indispensable, as in no other way can the lengthy rein, sloping shoulder, deep chest, strong loin and long quarter so necessary in this class be obtained with any certainty or regularity. Freedom of movement is essential, but high action and great trotting speed are neither required nor wanted. Horses of this class should stand not less than 15-1 nor more than 15-3, and should measure at least 8 inches below the knee and 70 inches in girth.

The first prize at Toronto was taken by a brown gelding named General, said to be by a thoroughbred horse. He was a remarkably well proportioned weight-carrier of considerable length and great substance. His measurements were as follows: height 15-3, cannon bone 8 inches, arm 21 inches, crest to withers 37 inches, withers to croup 33 inches, croup to tail 15 inches, girth 74 inches.

Horses of this stamp can best be procured by the use of selected thoroughbred sires on strong halfbred mares, or on the better class of roadster mares, or on mares from hackney or coach sires, provided they show some blood and quality. On mares having a preponderance of warm blood or those showing any inclination to weediness, a good hackney horse might be advantageously used.

The Mounted Infantry Horse.—The mounted infantry horse, for which such an unprecedented demand has recently arisen and which is likely to be even more sought after if present war conditions continue to prevail, is a smaller and cheaper animal than either of those already described. He is in fact a cob, a strong pony on short legs, with as much quality as can consistently be looked for in conjunction with the substance required to carry

an armed man. He must have a fair shoulder and a good back, be deep through the heart and stand squarely on good legs well furnished with bone. In height he may be from 14-1 to 15-1, but 14-3 is the favourite standard with Lieut.-Colonel Dent. Strength is the great desideratum, but a reasonable amount of activity is indispensable.

The little horse Hero, which took first prize in Toronto, stood 15-1, measured 7¾ inches below the knee and 19½ round the arm; from crest to withers he was 34 inches, withers to croup 27 inches, croup to tail 15 inches. He girthed 73 inches, and, as the measurements show, was an excellent type of the weight-carrying cob. Such horses can be obtained by a stout thoroughbred sire from French Canadian or other strong pony mares, or by the judicious use of the hackney horse on the smaller roadsters and on those little mares too common in Canada, resulting from the ill-advised use of the racing or rather sprinting type of thoroughbred on light mares of racing or trotting blood or other mixed breeding.

General Requirements.—In times of peace no horses are bought at less than four nor more than seven years old.

As regards colour, bays, browns, chestnuts and blacks are preferred, a few grays are required for special corps, but odd-coloured horses are not wanted.

No unsound or seriously blemished horse will be taken, the veterinary examination is fairly strict, but is also strictly fair. Undocked horses are preferred, and no horse with a very short tail will be taken.

In times of war, however, when the demand, as a rule, exceeds the available supply, purchasing officers overlook many minor defects, provided the animals offered are sound and serviceable, while conforming generally to the requirements of the service.

Advice to Breeders.—Breeders on the western ranges will no doubt find it profitable from this time forward to devote considerable attention to the production of horses especially adapted for military use.

In the other portions of the Dominion the supply of such horses can be enormously increased with but little extra effort or expense on the part of the breeder.

Immense numbers of light horses and ponies are annually bred in Canada, of which many when grown are, owing to their nondescript character, of but little value. If the breeders of these animals would send their lighter mares to pure-bred stallions, of the British breeds, intelligently selected with the view to the production of a definite type of military horse, a vast improvement in our clean-legged stock would speedily manifest itself.

High prices would then, as now, be easily obtainable for really superior animals; most of the others would find ready sale for army use, as well as for other purposes, while the misfits and object lessons would be less numerous, and, except by comparison, not less valuable than they are at present.

CHINA.—*The French Troops in China.*—The *France Militaire* publishes some extracts from the report of General Voyron on the looting by the French troops in China, in which he states that there were only some individual cases of looting difficult to prevent, but afterwards severely dealt with; and that on the whole the behaviour of the French troops was better than that of the troops of other nations. The march from Tien-tsin was very rapid, and the French troops arrived under the walls of Peking almost totally unprovided with food, and with sufficient covering for the night; the want

of both food and night-covering having been already felt on the line of march. Most of the houses were abandoned, and what was found in them in the shape of food and bedding was appropriated for the general use of the troops, but as soon as the inhabitants returned nothing was taken officially without a proper receipt being given. No doubt some small objects were taken by individual soldiers, which was scarcely to be wondered at considering the bad example of other troops. It should, however, be added that the inhabitants had taken away or hidden most of the portable things of value, and that perhaps their greatest losses were due to marauding bands of Chinese, who knew best where to find the hidden objects. With regard to the looting of the palace of Prince Li by the French missionaries, assisted by their native converts and the French soldiers and sailors stationed at Pei-tang, each soldier and sailor received a cheque, payable in France, for 2,000 frs., from the missionaries for his services. The next morning early some of their comrades stationed elsewhere, hearing of what had been done, came and took some ingots of silver away from the Li Palace on their own account and afterwards sold them, no doubt at a very considerable discount, to a Frenchman in Peking, who gave cheques for them. The looting was not authorised by General Frey, and he felt that it would give a great impetus to looting in general if he allowed the cheques in either of the above cases to remain in the hands of the individuals who had received them, and he therefore ordered them to be paid into a fund for the general benefit; and this was done by the soldiers, but the sailors refused to do it. General Voyron, in his report, justifies the looting of the Li Palace on the ground that Prince Li was one of the chief instigators of the Boxer rising. With regard to the French officers, they in common with the officers of other nations took some small objects from Peking as curios, of which the intrinsic value was very trifling. General Frey had a number of boxes (of loot) among his luggage, but these were intended for certain authorities in Paris or for the national museum. General Frey had arranged the matter with the consent of the French Minister in Peking; and General Voyron believes that the various persons, directors of museums and others, concerned had already been informed of the approaching arrival of these objects.

International Rifle Competition.—The *Tientsiner Wochenblatt* states that at Shan-hai-kwan on 18th and 19th August a shooting competition was held between 15 Germans, 15 Russians, 10 French, 15 English (really Indians), 10 Italians, and 15 Japanese. The conditions were to fire freehanded, standing and lying down, at a distance of 220 yards; 5 rounds, preceded by 2 trial shots, being fired in each position. The target was a German one of 12 rings, all the rings outside each hit counting. The Russians fired with their bayonets fixed, and the Japanese in the German fashion. The result was that the 15 Indians of the 30th Punjaub Regiment stood first with an average per man of 84.6 rings (out of a possible 120); the Germans next, with 79.2; then the French, 73.2; the Japanese, 70.9; the Russians, 66.9; and the Italians, 46.8 rings. In the pistol firing competition among the officers, an Indian officer carried off the first prize.—*Times.*

FRANCE.—*Instruction in Fencing.*—The French Minister of War has issued a report on the teaching of fencing in the French colonial infantry, in which he states that the cost of maintaining the *personnel* and *matériel* for this purpose amounts to about

£2,400 annually in addition to some expenses charged in the colonial budgets. The teaching engages and withdraws from the general colonial military service 248 men of the best class, who act as instructors and assistants. The general military training of these men is very slight, as nearly all their time is absorbed in learning and performing their special duties. They are, therefore, far less fit than their comrades to take the field. In addition every non-commissioned officer has to devote two hours per week to receiving instruction in fencing, and not only is this felt to be a waste of time, but in consequence of this frequent attempts are made to avoid it, thus causing continual trouble. The halls also in which the instruction is given are badly wanted for more useful purposes, as the men never use their bayonets as swords, but only when fixed at the end of their rifles, and for that reason no longer receive instruction in fencing; while the officers, commissioned and non-commissioned, although they carry swords when on parade, find their revolvers more useful in hand-to-hand fighting. In consequence of this report,the French President has issued a decree abolishing the teaching of fencing in the French colonial infantry.

Examination of Recruits.—The French Minister of War has sent a circular to the commanders of the various army corps requesting them before allowing the recruits who have just joined to receive any instruction to submit them to a very careful examination by the medical officers in order to see whether they are really physically fit to bear the fatigue of military service. The examination may extend to others than the recruits, and the strictest attention should be paid to the discovery of any signs of, or tendency to, tuberculosis. Full particulars of the men who receive their discharge in consequence of this examination, together with a statement of the nature of their disability, should be sent to the Minister of War. It is added that it will be of the greatest advantage to the army to remove from it all who by their physical inferiority burden it uselessly and help to fill the hospitals at the expense of the nation.

Army Promotion.—The *France Militaire* publishes in full the new Bill for regulating promotion in the French Army, together with General André's speech in the French Chamber introducing the measure. General André stated that the provisions of the old law, dating from 14th April, 1832, were excellent for the time of frequent war which existed from 1827 to 1870; but so long a peace as that which had existed since the latter date had not been foreseen. Without war the chief test of fitness for promotion ceases to exist, but there remains the liability in peace-time of a commanding officer's judging the suitability for promotion of an officer under him by some recent service rather than by the officer's whole career. The new Bill, therefore, provides that officers shall be nominated at any time as fit for promotion in consequence of meritorious service or evidence of special ability shown in the course of examinations or otherwise; and that promotion shall then follow according to seniority of nomination, unless in any particular case an officer shall be considered disqualified subsequent to his nomination either by his acts or in any other manner. The nomination shall rest with each general commanding an army corps, or, where an officer is not serving in an army corps, with the Minister of War. The latter shall also have the power of vetoing any nomination or any promotion by seniority of nomination. With regard to promotion

from the ranks, the new Bill provides that a man can become a corporal after four months' and a sergeant after ten months' service. The provision for further advancement is very large, as under the new Bill half of the total number of those promoted to be sub-lieutenants must be sergeants; and a sub-lieutenant will become a full lieutenant by right in the course of a further two years' service. Promotion from lieutenant will then follow by seniority of nomination under the conditions stated above. The other provisions of the Bill are of minor importance.

The War Budget, 1903.—The draft of the Budget for submission to the Chamber provides for the following expenditure :—

	Francs.
1st Section (Home troops)	646,562,539
2nd „ (Colonial troops)	28,375,011
3rd „ (Extraordinary expenditure)	36,062,450
Total	711,000,000

The Budget for 1902, as finally passed by the Chamber on the 30th March, 1902, amounted to :—

1st Section (Home troops)	638,440,070
2nd „ (Colonial troops)	27,905,823
3rd „ (Extraordinary expenditure)	49,136,475
Total	715,482,368

The present Budget, then, shows a decrease of 4,482,368 francs on that of last year.

The effective which has served as a basis for the present Budget shows the following differences as compared with that for 1902 :—

1902—28,768 officers ... 526,253 rank and file ... 142,610 horses
1903—28,987 „ ... 533,746 „ ... 142,823 „

In these numbers the gendarmerie is not included, which consists of 713 officers, one more than 1902, and 24,036 gendarmes, or 20 more than the previous year.

The increase in the number of officers is attributable to the effects of various regulations on the subject now first coming into full force. The increase of the rough budgetary effective of the rank and file is due to various causes, the chief of which are :—

The incorporation in the colonies of one of the battalions of the foreign regiments quartered in the colonies; the effective of the enlisted contingents; the experiment of employing natives (200) in the special branches of the service in Algeria, which will be tried in 1903; the formation of 3 companies of Sahara Oases troops; the formation of acting battery quartermaster-sergeants (60) to replace civilian employés; slight variations in the cadres of various schools, etc.; finally the suppression of a battalion of Sahara tiralleurs (544 men) and a squadron of Sahara spahis (216 men) has been taken into account.

As regards the horses, the increase of 213 is due to the reinforcement to field artillery (100); to the formation of 3 Sahara Oases companies (607) and taking into account the suppression of the Sahara tirailleurs and spahis (416), and of 100 mounted gendarmes who have been replaced by some mounted on bicycles.

Special Observations.—It will be remembered that M. Maurice Berteaux, reporter to the Budget for 1902, requested the inscription, as a

separate item, of all expenses due to manœuvres and technical exercises, so that Parliament could see for itself the cost of the instruction of the troops. On account of the various complications that would arise through complying with this request, the Minister did not consider that he ought to open a new item in the Budget, but he has noted items due to the expenditure of manœuvres, either in a paragraph by themselves, or else under a special heading.

The draft announces the formation of a supervisory staff at the War Department, and the re-organisation of the General Staff. The assessment for the first issue of equipment and saddlery for non-commissioned officers promoted adjutants or officers, has been increased, and for that purpose a sum of 180,000 francs has been inscribed in the Budget.

The chapter dealing with the gendarmerie shows an increase of 94,291 francs for the detachment at Crete; the formation of 3 foot brigades in France; the promotion of 12 lieutenants to captain's rank; and the purchase of 200 bicycles. Food, both meat and forage, are more liberally dealt with than in the preceding Budget, and in Algeria the salt pork ration is replaced by one of preserved meat. The artillery establishment receives a supplementary credit of about 2,000,000 francs, owing, in part, to the higher price of the new cartridge; 260,000 francs are devoted to the replacing of military by civilian manual labour; 300,000 francs for coast artillery ammunition; 100,000 for automobiles for general officers, etc.—*Précis from Budget Général de l'Exercice, 1903*, and *La France Militaire*.

GERMANY.—*Motor Cars in German Army.*—The *Allgemeine Automobil-Zeitung* states that during the German army manœuvres the Emperor used a 16-H.P. Mercèdes motor-car. Altogether there were 20 motor-cars in use. These were supplied by the firms of Daimler, Benz, Dürkopp, Marienfelde, Adler Opel and Stoewer, and by the Eisenach Works. For despatches, motor bicycles were used, and gave general satisfaction; the types being the Neckarsulm, Cyclon (Erlau), and Progress (Berlin). The bicycles with front driving wheel were found to be the best for soft roads. Ten Daimler motor wagons were used, in conjunction with several traction engines by Thornycroft and by Fowler, to bring up the supplies. The special work of the Daimler wagons was to fill two of the manœuvre provision magazines. The work performed by them amounted to the carrying of 330 tons a distance of about 40 miles, and this was done in the best possible manner. Experiments were made of attaching a second wagon to the Daimler wagon, and the two together carried a net load of ten tons at a speed of six miles an hour, but this was chiefly over good roads. Cheap spirit was used as fuel for the motor wagons, the cost being not much greater than that of benzine, with the advantage that it was a home-made product. None of the motor-cars or wagons used had a serious breakdown in their machinery, although the work performed was very heavy.

Effective of the German Cavalry.—General Zeppelin, whose name is well known in European Armies, has recently devoted an article to the German Cavalry, under the title, "A serious word on the subject of Germany's preparation for war." In it he says that the cavalry has not increased in numbers with the remainder of the German Army, but has remained at almost the same strength as it was at the foundation of the empire, if the formation of a few Jaeger squadrons are deducted from it. As a matter of fact, according to the law of 1874, the effective of the German Army was fixed at 401,659 men; the infantry consisted of 469 battalions;

the cavalry of 465 squadrons; the artillery of 300 batteries. There were in addition 29 foot artillery battalions, 18 engineer, and 18 transport battalions.

In 1880 the effective decreed amounted to 427,274 men, and all branches of the service saw the number of their units increased, with the exception of the cavalry, which was still restricted to its 465 squadrons. In 1887 the effective was increased to 468,419 men, and the cavalry remained stationary. In 1890 there was a fresh increase in the effective, and still the cavalry retained its 465 squadrons. In 1893 the two years' period of service was introduced, the effective reaching to 557,093 men, but still the cavalry only consisted of 465 squadrons. Thus in less than twenty-five years the Army was increased by 155,000 men, and nevertheless the cavalry remained stationary. It was only in 1897 and 1899 that, thanks to the formation of mounted Jaegers, the number of squadrons was progressively increased by 17: but in the same time the infantry was increased by 87 battalions, the field artillery by 80 batteries, the foot artillery by 1, and the engineers by 3 battalions. The infantry, in short, increased by one third, the field artillery by nearly one half, whilst the cavalry was only increased by one twenty-seventh. And in addition to this, General Zeppelin remarks that the German cavalry possesses no permanent cadre for the formation of reserve units.

He then compares the effective of the Germans with those of the Russian and French cavalry, and with regard to this says: "If our Eastern neighbour is so superior to us in the strength of his cavalry, our position assumes an even darker aspect when we fix our attention on our Western neighbour. In 1900 France had 7 divisions of independent cavalry, 19 corps brigades, and 4 brigades in Algeria and Tunis, altogether 447 squadrons. In addition, in time of war the reserve cavalry consists of 38 fifth squadrons (?), and of 41 reserve squadrons (?), for which only weak cadres are maintained in peace time." The especial advantage, however, that General Zeppelin sees in favour of the French cavalry, is in the constitution, in peace time, into divisions, of regiments destined to form the independent cavalry, and in the fact that a large number of these regiments are, in advance, quartered near the frontier of Lorraine.

Commenting on this article, the *France Militaire* says that although it is no part of its duty to rectify the errors General Zeppelin makes in favour of the French war and reserve squadrons, yet it considers the article as interesting as evidence of a certain uneasiness in the German Army, an uneasiness dating from far back, with regard to this non-constitution of cavalry into divisions in peace time. It considers, however, that the General has painted the picture, designedly, in as sombre colours as possible, in order to create a movement in favour of an increase of the German cavalry.

UNITED STATES.—*Report on the Joint Manœuvres.*—The War Department has finally made public the report of Major-General Arthur MacArthur on the joint manœuvres of the Army and Navy, which occurred last September. General MacArthur's report is dated 1st October, 1902, and is in part as follows:—

"One of the most notable features of the manœuvres was the gravity, professional zeal, and dignity which characterised the deportment of all concerned. Although it was apparent that reciprocal hostile action, which moulds the events of a real campaign, was absent, it was also very obvious that the fresh and novel situations which arose from bringing ships against forts, afforded a considerable scope for decision and ingenuity, and for the manifestation of intelligence, vigour, judgment, and composure, in very much the same manner as would have occurred in regular field operations.

It is therefore a great pleasure to report to the Department the complete professional success of the manœuvres, together with a suggestive recommendation in behalf of an annual repetition thereof, until the entire system of our coast defence has been subjected to a similar test. As preliminary to the general discussion, it may be said that the United States in all warlike emergencies can rely with absolute certainty upon everything possible of accomplishment, by reason of the voluntary efforts of a practically inexhaustible number of courageous, self-respecting men, and may rely also upon everything that can be quickly produced by the employment of an unlimited supply of money. These indispensable elements of military power must always be a matter of great comfort to the nation, but in the complacent contemplation thereof it must not be forgotten that the enthusiasm of the whole nation, supplemented by billions of wealth, cannot create on the instant anything in the production of which time is the essential element.

"The fortification work of the Engineer Corps and the Ordnance Department embraced within the limits of the manœuvre districts cannot be too highly commended. The gun emplacements, both in location and construction, are admirable, and the guns, mortars, and carriages installed therein are splendidly adapted to the purposes of an artillery defence. In speaking in broad terms of this great national question of coast defence, it may be said that everything relating to emplacements and guns has long since passed the experimental stage, in the light of which fact, and having reference to the preceding formula in respect of time as an incident of constructive work, the primary conclusion which is suggested by the manœuvres is to the effect that all projected coast defence works be hurried to completion as quickly as possible. When all projected works are completed and armed, the coast-line of the United States will be practically impregnable against any hostile attack, provided the guns can be properly manned, and the fire action thereof can be developed to the full limit of its useful effect.

"The formation of an Artillery Reserve, composed of men having some knowledge of the coast service, is a problem of national concern. If the various coast States could be induced to regard the problem somewhat in the nature of a local issue, a scheme could easily be worked out, whereby all of their militia organisations could have annual training in the batteries at comparatively small expense to either the States or the nation. In several instances State organisations have been designated for this duty, which only emphasises the fact that all State troops contiguous to sea forts should receive training of this kind, as in case of emergency the entire body of militia contiguous thereto would hardly be more than half enough to raise the garrisons to a war footing.

"The foregoing remarks, and the admirable service rendered by the Massachusetts regiment, and the coast Artillery companies of Connecticut in the recent manœuvres, suggest the important conclusion as the result thereof, to the effect that the States of interest be invited to confer with the War Department with a view to the formulation of practical methods whereby this important training may be imparted to the largest number of men possible. Another most important conclusion is to the effect that a reserve supply of small arms, ammunition, and essential equipments, sufficient to ensure adequate land support for the coast-defence line, by the voluntary organisation of the contiguous populations, be placed in arsenals of supply, dedicated exclusively to this purpose, and this purpose only, with a view to a minimum organisation of not less than 150,000 men.

"The importance of submarine devices as an element of coast defence was emphasised more by what was not done than what was actually accomplished during the manœuvres. The absence of mines in several places greatly weakened the Artillery defence, and permitted very brilliant naval action which would have been impossible in mined and obstructed waters. The reason mine fields were not employed more extensively was simply because of want of facilities to do the work quickly. The School of Submarine Defence at Fort Totten should be magnified in every way expedient and the reconstruction of the post to meet all the demands of such an institution be expedited as rapidly as possible.

"The organisation of the service of information was exceedingly satisfactory in every particular, and was an agreeable indication of what may be expected and what will undoubtedly be accomplished in actual war when the unlimited resources of the country are applied by such a thoroughly efficient organisation as the Signal Corps of the Army. In this connection especial attention is invited to the reports which describe the experimental employment of wireless telegraphy, the success of which in this instance suggests the expediency of further practical investigation, which, perhaps, would be more readily accomplished by the Navy than by the Army, as the most favourable field for such work is afloat rather than on shore."—*Army and Navy Journal.*

CORRESPONDENCE.

GENERAL WOLFE'S ADVICE TO A NEWLY-JOINED ENSIGN IN 1756.

To the Editor of the JOURNAL OF THE ROYAL UNITED SERVICE INSTITUTION.

H.M.S. "Duke of Wellington,"

Portsmouth,

21st December, 1902.

SIR,—I was much interested in Mr. Dalton's account of a letter of General Wolfe's, published in this month's R.U.S.I. JOURNAL, and I think I may give you a little information as to the design of the watermark illustrated.

This design is evidently a Dutch one, because it is practically identical with that covering the upper part of the stern of a Dutch line-of-battle ship of 1676, which I think you will find illustrated in Charnock's "Naval Architecture." The lion is holding a sheaf, or "gerb" of arrows. In the

ship, however, he is not crowned, and the motto is absent. The female figure in the ship seems to be holding a sceptre with what may be a cap at the top of it, but it is not at all distinct. The fence is wattled and the gate to the left, but there is no doubt it is the same design. I think I have seen, either in Charnock or elsewhere, a Dutch ship's stern with the lion and fence, without the female figure. Again, De Ruyter's flag-ship, "The Seven Provinces," had her stern decorated with a large design of a female figure seated inside a fence similar to the others, but with no lion.

Hoping that these items may be of interest to you,

I am, yours truly,

C. FIELD,

Major R.M.L.I.

NAVAL AND MILITARY CALENDAR.

DECEMBER, 1902.

3rd (W.) Correspondence respecting evacuation of Shanghai by International troops published.

" " 36th Brigade Division R.F.A. arrived at Southampton from India in the "Plassy."

5th (F.) H.M.S. "Hood" paid off at Devonport.

6th (Sat.) H.M.S. "Barham" paid off at Portsmouth.

8th (M.) The Premier announced that the British and German Governments, acting together, had decided that if no satisfactory reply was received to their final communications to Venezuela, they had decided to take steps to enforce their demands.

" " Stated in the House of Commons that the Somaliland Military operations had been taken over by the War Office.

9th (T.) 105th Company R.G.A. left Sierra Leone for England in the "Akabo."

10th (W.) 36th Company R.G.A.
2nd Bn. Royal Sussex Regiment } Arrived at Southampton from India in the "Soudan."

" " Report that the Sultan of Morocco and his forces were surrounded by rebel forces.

11th (Th.) Launch of third-class cruiser "Undine" from the Howaldt Yard, Kiel, for German Navy.

12th (F.) The President of the Venezuela Republic claimed arbitration.

13th (Sat.) 2nd Bn. Leicester Regiment
1st Bn. West Kent Regiment } Arrived at Southampton from Egypt and Malta in the "Dominion."

14th (S.) H.M.S. "Thetis" left Sheerness for China.

15th (M.) Official correspondence with Venezuela published.

16th (T.) Launch of first-class armoured cruiser "Cumberland" from the London and Glasgow Shipbuilding Company's Yard, Glasgow.

" " "B" Batt. R.H.A.
2nd Bn. Durham L.I. } Arrived at Southampton from India in the "Assaye."

" " 1st Bn. Duke of Cornwall's L.I. arrived in South Africa from Ceylon in the "Golconda."

17th (W.) Italy, Spain, and Belgium sent in notes respecting their claims to Venezuela.

" " 1st Bn. East Lancashire Regiment arrived at Queenstown, Ireland from Cape Town, in the "Sunda."

20th (Sat.) Launch of first-class battle-ship "Braunschweig" from Germania Yard, Kiel, for German Navy.

" " "C" Batt. R.H.A. } Arrived at Southampton from
" " 2nd Bn. York and Lancaster Regt. } India in the "Sicilia."

" " The *London Gazette* announced the terms of Venezuelan blockade by Great Britain and Germany.

21st (S.) 105th Company R.G.A. arrived in England from Sierra Leone in the "Akabo."

22nd (M.) Royal Warrant issued regarding allowances to Army officers.

23rd (T.) The Sultan of Morocco was defeated by the rebels.

26th (F.) Reported that disputed matters with Venezuela were to be referred to the Hague Tribunal.

27th (Sat.) H.M. the Queen gave a dinner to 1,500 widows and orphans of soldiers who had fallen in South Africa.

28th (S.) H.M.S. "Andromeda" arrived at Plymouth from Mediterranean.

29th (M.) The Viceroy of India made a State Entry into Delhi.

FOREIGN PERIODICALS.

NAVAL.

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for 1900." "The Mercantile Marine." 13th December.—"The German Naval Manœuvres." "Yachting Notes." 20th December.—"The Food Supply of England." "Yachting Notes." "The New First-class Battle-ship 'Suffren.'" "The Mercantile Marine: French and Foreign." 27th December.—"Admiral Gervais." "Destroyers and Torpedo-boats of the *Défense-Mobile*." "Yachting Notes." "The Russian Torpedo-cruiser 'Novik.'" "The Stranding of the 'Medoc.'"

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La Marine Française. Paris: 15th December, 1902.—"Budgetary Patriotism and our English Naval Programme." "A Contribution to the Study of the Engineer Question: The Necessity of Maintaining the Autonomy of a Corps of Engineer-Officers." "The Destruction of the Insurgent Haytian Cruiser 'Crète-à-Pierot' by the German Gun-boat 'Panther.'" "The Opinion of Russians on the Projected Canal Between the Atlantic and Mediterranean." "The Conquest of the Waves: A New Form of Breakwater." "Foreign Naval Notes."

GERMANY.—*Marine-Rundschau.* Berlin: January, 1903.—"The Operations of the Russian Fleet During 1853-54." "During the Time of Admiral von Stosch." "Increased Effect of Projectiles Against the Improved Armour-Plating." "Report of the Commander of the 'Hertha' on the Typhoon of 9th August, 1902, in the China Sea." "Some New French Regulations on the Hygiene of Ships and their *Personnel*." "The Year's Report on the Navy of the United States for 1901-02." "A Compass-Card with Correct Divisions into Degrees." "How the Inventor of the Compass was Discovered." "Discussion on the Lecture: 'Compass Experiments and Improvements in the Imperial Navy During Last Year.'" "Foreign Naval Notes."

ITALY.—*Rivista Marittima.* Rome: December, 1902.—"Cruisers and Battle-ships: Some Practical Considerations." "The Navigation of the Po and its Future." "The Method of Experimenting with Ships' Pendulums Applied to some Ships of War." "Draft of the Regulations Presented to the Chamber of Deputies by the Minister of Marine at the Sitting of the 27th November, 1902." Letters to the Director:—"More About the Question of Milazzo." "Engines and Engineers on board Ship." "About the 'Varese's' Boilers." "Foreign Naval Notes."

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BELGIUM.—*Bulletin de la Presse et de la Bibliographie Militaires.* Brussels: 15th December, 1902.—"Military Events in China, 1900-1901" (*continued*). "The English Infantry Provisional Drill Regulations" (*continued*). "Cavalry Scouting from the Revolution to the Present Day" (1 map, *continued*). 31st December.—Has not been received.

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December, 1902.—"Colonel Cecilio Fabris: Obituary Notice." "From Weissenburg to Sedan, 1870." "The Education of Officers." "On the Efficacy of Rifle Fire." "The New Infantry Regulations of the Austro-Hungarian Army" (*continued*). "Foreign Military Notes."

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UNITED STATES.—*Journal of the United States Artillery.* Fort Monroe: November-December, 1902.—"Extracts from the Minutes of the Artillery Board." "The Tactics of Fire Direction." "A Graphical Chart for Showing Slight Deviations for Sea-Coast Guns in Action." "Report on Fire Control and Fire Direction and the System used at Battery Crantson, California." "Remarks upon the Report of Captain Haan on Fire Control and Fire Direction." "Professional Notes." "Book Reviews."

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NOTICES OF BOOKS.

The Oxfordshire Light Infantry in South Africa. A Narrative of the Boer War from Letters and Journals of Officers of the Regiment, and other sources. By Lieut.-Colonel A. F. MOCKLER-FERRYMAN. Eyre and Spottiswoode.

The narrative is naturally fragmentary and not altogether in sequence, but that does not detract from its value to every student of the South African campaign. There is an abundance of information which thus reaches the reader first-hand, and is therefore all the more reliable. The regiment reached South Africa in time to take part in the invasion of the Orange Free State early in February, 1900.

In the early stages of that advance the regiment appears to have fared well enough in the way of food :—"Lots of mutton and beef here, as this move of ours has been a bit of a surprise to the Boers, and they went off in a hurry, leaving their stock behind on the farms. No meat is issued, but we send out parties, take what we want, and slaughter it ourselves, so, as you can imagine, the regulation one pound is not weighed very carefully." The subsequent capture of large numbers of cattle, sheep, and goats rendered the feeding of the division secure for some time in advance. The subsequent capture of the large convoy of food and forage at Waterval Drift compelled the supply officers to place the troops on half rations from 20th February; subsequently some of the brigades got little more than quarter rations. The hardship of such a situation is hardly realised by the casual reader—imagine yourself doing a march of from 20 to 30 miles daily, under a tropical sun in the burning heat of a South African summer, with very little water to moisten a parched tongue, subject to the fierce attack of an ambushed enemy at any moment, and at the day's end to find only the remains of a ration of about a pound weight to sustain and recuperate the exhausted mental and bodily organisation. Try it for one day, as far as that may be possible, and you will begin to appreciate the hardships and perils of a soldier's life. We read of the poor men being so parched with thirst that the breaking of a storm of rain was nothing short of a godsend to them. There was not only the physical torture to be endured, but there was the mental strain as well; the only compensation being that there was always an abundance of pure, fresh air, which is no insignificant factor in the maintenance of the health of both body and mind.

The description given of the capture of the Boer army under the command of Cronje at Paardeberg is replete with interest and information. The diary tells us that on the day, 18th February, when Cronje's army was hemmed in, the regiment "marched off at 3 a.m. without food or water." Then on the 20th it continues thus :—"Got up at 4.30 a.m. and marched a mile to the regimental bivouac, very hungry and thirsty, as we had had no food or water since 5 p.m. yesterday." These quotations in reference to a single battalion may be taken to have a direct application to the actual situation of the whole British force. It was on the third day of the defence

that the Boer camp was subjected to a bombardment from no less than 110 heavy guns. The incident recalls the somewhat similar situation of Sedan just before the French surrendered—not so with the Boers, who continued their obstinate but heroic resistance for another seven days. The most remarkable circumstance connected with this siege is that a body of 5,000 Boers were able to hold out for ten days in a confined space of not much over a square mile with so few casualties. The number of wounded found within the entrenchments does not appear to have exceeded 170; but the numbers of the killed will never be ascertained—it is more than probable that the Boers do not really know how many fell, as it was found necessary to throw the dead bodies of both men and horses into the river almost as soon as they were killed. We do not know which we admire most, the obstinately passive defence of the conquered, or the *élan* and courage of the attacking and half-famished forces. It was indeed a positive way of blotting out the disgraceful memory of Majuba.

Colonel Evelegh's experiences as a prisoner of war is good reading. He describes how half-a-dozen of them managed to find Haldane, Le Mesurier, and Brockie in their underground dwelling at the Model School for the seventeen days prior to their escape from Pretoria. The Rev. Mr. Godfrey and a Dr. Veale, both presumably British, are held up to the gaze of the public for their bad treatment of British prisoners.

The chapter on the Boer prisoners in Ceylon is full of interest and information. There were about fifty foreigners among the prisoners on board ship, of whom "four or five were Englishmen, any number of Germans, Austrians, and French, and a couple of Americans. The younger Boers and Free Staters had their games in the afternoons also, which consisted of wrestling and various feats of strength. The older men sat apart, smoking, and looking surly and bored with the whole proceedings." When crossing the Equator, Glen, one of the English prisoners, asked permission for Neptune to come on board. This being granted, "Glen represented Neptune, and the part of the wife was taken by a little Frenchman. Most of the younger men took the shaving and ducking in good part, but the older ones did not appear to appreciate the joke. After about an hour or so, seeing that the relations between the burghers and the foreigners were becoming rather strained, we thought it now prudent to stop the entertainment."

The book is distinctly useful, which is more than can be said of a good deal of the literature which has appeared on the war, and affords some pleasant reading.

PRINCIPAL ADDITIONS TO LIBRARY DURING DECEMBER, 1902.

The Wealth and Progress of New South Wales, 1900-01. By T. A. COGHLAN. 8vo. (Presented.) Sydney, 1902.

Journal de Guerre de General de Wittich. Translated in French by COMMANDANT RICHERT. 8vo. Paris, 1902.

Aus Meinem Tagebuche 1870-71. By GENERAL VON WITTICH. 8vo. Cassel, 1872.

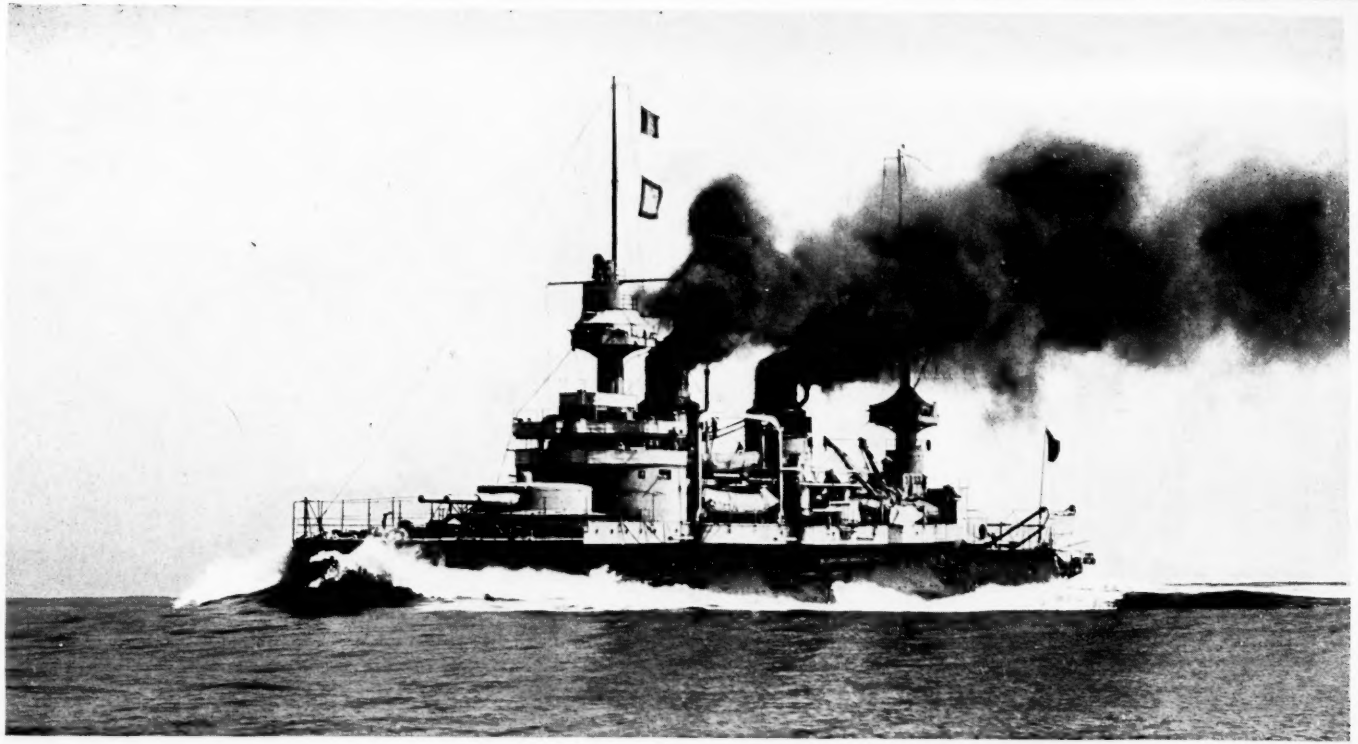
List of Officers Serving with Mounted Infantry in South Africa, 1901 and 1902. 8vo. (Presented.) Pretoria, 1901 and 1902.

Agrandissement d'Anvers; Exposé et Solution de la Question. By GENERAL BRIALMONT. 8vo. Brussels, 1902.

The Bombay Artillery List of Officers. By COLONEL F. W. M. SPRING. (Presented.) London, 1902.

Geological Survey: Monographs. Vol. XLI. Demy 4to. (Presented.) Washington, 1902.

On the Veldt in the Seventies. By SIR CHARLES WARREN. 8vo. 16s. (Presented.) London, 1902.



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ERRATA.

Page 82. Line 4. For "Great" read Greet.
Line 10.—For "Hayard" read "Hazard."

LECTURE NOTICE.

February 18th (Wednesday), at 3 p.m. "Partisan and Guerilla Warfare." By T. Miller Maguire, Esq., M.A., LL.D., Barrister-at-Law.